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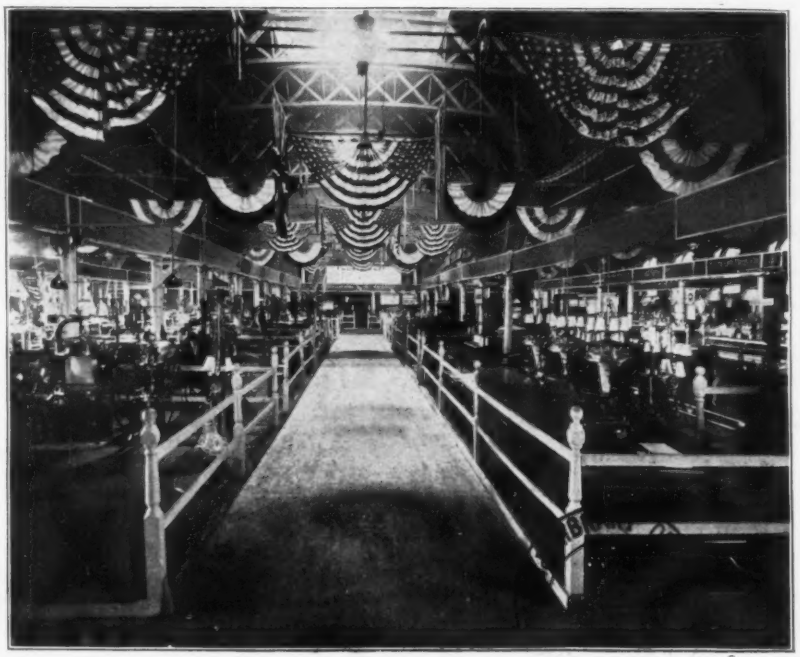
TEXTILE WORLD RECORD



A View in the Knitting Machinery Exhibition.

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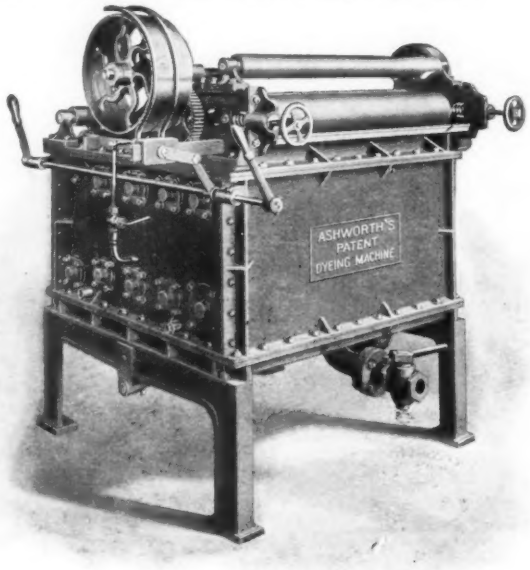

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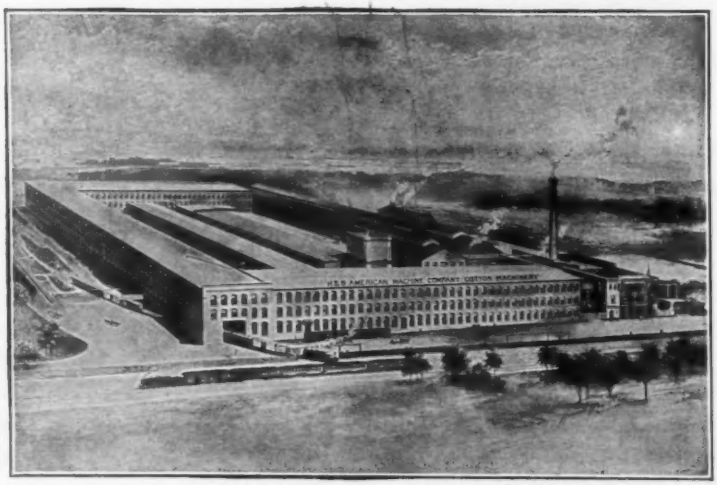
Correspondence

We solicit correspondence on textile subjects. Articles accepted will be paid for. Name and address must always be given, not necessarily for publication. Subscribers are invited to make free use of our Questions and Answers Department; correspondence is strictly confidential.

COTTON MACHINERY



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TEXTILE WORLD RECORD

MAY, 1913

Monthly Comment.

English and American Prices for Cotton Yarn

As this issue is about to go to press, we received the following quotations on representative qualities of cotton yarn, packed in cases F O. B. Liverpool, from one of the leading spinners of Lancashire. We have reduced their prices to American money, and annexed the American prices for corresponding grades and size. The English terms are net cash 45 days. The American terms will average net cash 20 days:

Yarn	English Price	Underwood Duty Per Cent	English Total	American Price
Warp Cops:				
20s Am.....	18½	10	20.3	23½
30s "	20¼	10	22.3	26½
40s "	23¾	15	27.3	35½
50s Egn.....	32½	17½	38.2	47
60s "	35	20	42.	54
80s "	44½	20	53.4	70
Weft Cops:				
20s Am.....	18	10	19.8	24
30s "	19¼	10	21.1	27
40s "	20½	15	23.6	36
50s Egn.....	23	17½	27.	48
60s "	27¼	20	32.7	55
80s "	35	20	42.	72
Combed Ring Warp Bundles:				
20s Am.....	20	10	22.	29
36s "	23¼	10	25.6	39
40s "	25½	15	29.3	41
2/40s "	26½	15	30.5	41
2/40s Egn.....	32	15	36.8	50
2/50s "	34	17½	40.	56
2/60s "	36	20	43.2	62

Canada's Lesson for the Wilson Administration

The experience of the Canadian woolen and worsted industry under the preferential tariff of 1898 is of special interest owing to the revision of our tariff at the present time. The Canadian tariff of 1898 provided for three rates. The lowest was for goods produced in the United Kingdom and certain British colonies. An intermediate rate was provided for imports from countries with which Canada had negotiated commercial treaties. All other imports were subject to the highest or general rate. From 1898 to 1904 the Canadian rates on wool cloths and clothing were: preferential, 23 1/2 per cent.; intermediate and general were 35 per cent. This proved so injurious to the woolen industry that the preferential rate was raised to 30 per cent., but without checking the decline of the Canadian industry. On an average the Canadian tariff on wool goods is slightly lower than the Underwood bill, but the difference is so small that the experience under the Canadian tariff is an excellent guide in forming a judgment as to the effect of the Underwood bill in the United States.

With commendable enterprise the "Daily Trade Record" some time ago sent a representative to Canada to study and report on the effect of the 1898 tariff on woolen and

worsted manufacture in the United States. The first installment of his report, from which we take the following extract, shows that in the fourteen years following 1898 the amount of woolen machinery in Canada decreased about one-half:

The early history of the Canadian woolen industry is obscure, and this is chiefly due to the lack of statistical information by any recognized trade organization or by the Ottawa authorities. From the early days, when immigrants and Canadians left the more thickly populated East and settled in other sections of the Dominion, there is apparently no record of the innumerable small mills and plants which were located here and there throughout the Dominion. The best obtainable information shows, however, that in 1885 there were 240 woolen and worsted mills in the Dominion and that these mills operated 460 cards and 2,062 looms. The 1912 census showed that there were then in Canada but 78 mills, with 224 cards and 1,154 looms. In this connection the following table will be of interest:

Years.	Mills.	Cards.	Looms.
1885	241	460	2,062
1899	236	477	2,120
1907	148	348	1,561
1912	78	224	1,154

These looms are broad looms; two narrow looms being taken for one broad loom.

The table is self explanatory, but in passing, it might be noted that from 1885 until the new tariff became effective, after June 30, 1898, there were comparatively few changes in the figures, and that while there were five less mills in operation in 1899 than in 1885, the actual number of cards and looms operated had increased. But the real effect of the 1898 tariff upon the Canadians begins to be appreciated when the figures for 1907 and 1912 are analyzed. In the period of eight years over 30 per cent. of the mills in operation in 1899 closed, and there was a difference of nearly 25 per cent. in the number of looms being operated. The following five years added to this, and it appears that in the 13-year interval from the time of the administration of the new tariff, over two-thirds of the mills in operation in 1899 have gone out of business and that in 1912 there were being operated a little over 50 per cent. of the looms that were producing goods in 1899. The number of cards has been decreased to practically the same percentage as looms.

In 1899 the woolen and worsted mills of Canada, according to the best available statistics, produced 13,992,000 yards. In 1912 they turned out 7,616,400 yards.

In 1893, importations of woolens, worsteds, flannels, etc., totaled 7,434,027 yards. After the new tariff became effective, in 1898, the yardage of imported fabrics for the first year was 6,301,196. For the seven months ending with Oct. 31, 1912, total importation of woolens, etc., into Canada was 14,173,330 yards, and if this volume of business was extended entirely through 1912 (as it is understood it was), the total importation yardage for 1912 would be approximately 24,297,157.

The imports of wool goods of all kinds into Canada for the year ending March 31, 1912, were valued at $24,343,738, on which the tariff averaged 28 per cent. ad valorem. This was at the rate of $3.38 (foreign valuation) per capita for the Canadian population of 7,200,000.

Let us compare the Canadian imports of wool goods with those of the United States. For the year ending June 30, 1910, wool goods were imported into the United States to the value of $18,049,332, on which the duties collected averaged 90 per cent. ad valorem. This was at the rate of 18 cents per capita for the population of 93,800,000.

At the Canadian rate of importation under a tariff of 28 per cent., the imports of wool goods into the United States would have amounted to $317,044,000, or more than 75 per cent. of the value of all the goods ($419,826,000) manufactured in the 913 woolen and worsted establishments in the United States in 1909.

That is the measure of the possible competition to which the Wilson administration is about to expose the woolen and worsted industry in this country. It is no answer to say that foreign mills are not in a position to supply such an enormous quantity of goods on short notice. That is true, but this Underwood tariff may remain a law for some years. In the meantime the mills of foreign countries, operating at a much lower cost of manufacturing, can increase their production enormously by pushing operations, and thereby make their cost still lower. The Underwood bill proposes to abolish at one stroke the high protection under which the American industry has been developed for forty-six years, and to substitute a tariff making possible the foreign competition now existing in Canada where wool goods are being imported annually at the rate of $3.38 per capita. That competition has destroyed a large part of the Canadian industry. The President and members of the House and Senate may realize this more clearly by reading the following letter received by us from the Montreal Woolen Mill Co., when the Canadian industry was in its death throes, and published in our issue of January, 1909:

Montreal, Dec. 23, 1908.

Dear Sirs: We are in receipt of yours of the 21st, 1908, and note contents. We have done as requested in your slip and hope same will be satisfactory. We also enclose a circular which explains our position. We have been in business for the past 30 years and have always paid good interest on the capital invested until the last four years. Since the present liberal party came into power they have lowered the duty from 50 to 23 1/2 per cent. and have practically annihilated the woolen industry. During their stay in power they have through their free trade policy been the cause of 75 per cent. of the woolen mills closing and if they stay in power much longer there will be none left and the once biggest Canadian industry will be no more. We have during the last four years lost money, but have been hanging on expecting a change in the Government, which did not come, and we now have decided to liquidate our plant while we can pay 100 cents on the dollar. Do you know what the duty on second-hand woolen machinery is into the States? If same is low enough we may induced to move our machinery and go over, providing we could secure a good location at a reasonable figure. If not too much trouble we would be much obliged if you know of a place that you think would suit our requirements to let us have a line from you. We prefer a plant with water power if at all possible to get. Thanking you in anticipation of an early reply and wishing you a Merry Christmas and a Prosperous and Happy New Year, we remain,

The Montreal Woolen Mill Co.

Following is the circular to which the above letter refers:

Montreal, Dec. 7, 1908.

Dear Sir: It is with deep regret that we beg to announce to the trade our decision to liquidate our business of manufacturing woolens. We are compelled to this course of action by the realization of the fact that we cannot, under the existing conditions, hope to operate our mills profitably.

We consequently desire to inform you that we will only execute repeat orders for such goods as we may have the requisite raw materials for, up to 31st inst., when we discontinue advance orders and only deliver stock goods, and orders already booked.

We have at present a large stock of manufactured goods, which we will be pleased to show the trade at clearing prices.

Yours truly,
Montreal Woolen Mill Co.

The lesson which Canada teaches is that our tariff, admittedly too high and badly adjusted now, should be revised with moderation and not in the radical manner proposed by the Underwood bill. Will Congress and the President learn the lesson and improve their opportunity?

Moisture in Wool and Cotton

Circumstances combine at the present time to bring forcibly to the attention of the textile trade the importance of establishing standards of moisture for textile materials. Among the most important of these is the revision of the tariff. In our April issue we pointed out the necessity for establishing moisture standards in the administration of the Underwood cotton schedule, whose rates are based on the count of the yarn. Without established standards the tariff on cotton yarn and cloth will rise and fall automatically with the erratic changes in atmospheric temperature and humidity. We showed how serious these changes would be in a section of the country subject to such wide variations in weather conditions as are found in New England.

FOREIGN AND AMERICAN STANDARDS

It is not alone the basing of the cotton tariff on the yarn count that makes the question of conditioning of special importance. In all probability the Underwood bill will give the American textile trade access to raw and partly manufactured materials, such as scoured wool, tops and yarn, that are now excluded, but which are ordinarily bought and sold in Europe on a conditioned basis. American producers of these products will, consequently, be forced to take into consideration, not only the tariff that protects them against foreign competition, but also the moisture standard by which the foreign products are sold. Take worsted tops, for example, which are ordinarily sold in Europe with an allowance of 18 1/4 per cent. for moisture added to the bone-dry weight of tops if combed dry, and 19 per cent. if combed in oil.

If the American top maker invoices his product at a weight which represents less than this allowance of 18 1/4 or 19 per cent., he is placed at a disadvantage by the amount of the difference, and to that extent will the protection afforded by the tariff be diminished. This shows the importance of putting the American trade on a conditioned basis without delay.

In the case of worsted tops the trade here has a moisture standard for tops partially established. Unfortunately, however, this standard is an allowance of 15 per cent., which gives the foreign top maker an advantage amounting to 3 1/4 or 4 per cent. of the bone-dry weight.

A NEW PROCESS

To this it may be said that the American top makers can avoid the difficulty by charging an increased price and explaining the difference to his customers. That would be impracticable in any event, but it is made impossible by the general lack of information regarding the conditioning of textile materials. We recently learned of a striking example of this ignorance. An expert in conditioning had talked long, learnedly and earnestly with a leading top maker regarding the importance of selling tops on a conditioned basis and was encouraged to proceed by the apparently intelligent appreciation of his argument, as shown by various affirmative signs on the part of his hearer, when the expert was dumbfounded at the close of his exhortation to have the top-makers exclaim:

"Oh, yes. I believe thoroughly in conditioning. We always store our tops in a damp room to condition them."

When such misunderstanding of the subject is exhibited by a top maker we can count confidently on worse things from the buyers of tops.

Worsted yarn supplies an illustration parallel to that of tops except that no standard for regain has been established in the United States, the foreign standard being 18 1/4 per cent.

THE CONFUSION OF A DOUBLE STANDARD

After a standard for conditioning is established it is immaterial whether it provides for 15 or 18 1/4 per cent., for prices would become adjusted to either allowance, but in the situation that now confronts the trade the danger is in attempting to use two standards, one for the foreign product and the other for the domestic. That would surely cause interminable confusion, serious losses, and a reduction of the already dangerously low rates of the Underwood tariff bill. These difficulties can be avoided only by the adoption of a standard for moisture that is uniform for both the foreign and domestic product.

THE PROBLEM IN THE COTTON TRADE

Practically the same problem is encountered in the cotton trade. The established European standard for conditioning cotton is 8 1/2 per cent. on the bone-dry weight, while in this country the conditioning of cotton materials is almost unknown. In the recent agitation of the question, however, the proposition has been made to adopt a regain standard of 7 1/2 per cent. for cotton. If this is done, then the producers of cotton products in this country will be in the same difficulty as we have pointed out in the case of tops, that is, the necessity of charging a higher price to offset the difference of 1 per cent. in the allowance for moisture and to make a satisfactory explanation of the advance to a trade unfamiliar with the practice of conditioning, or to suffer a discrimination equal to 1 per cent. in their competition with foreign producers. The remedy here, as in the case of wool, is to establish the European standard for regain, for it is useless to think of bringing about a change of the European standard.

THE PRODUCER OF RAW MATERIAL

There is, moreover, another side to the question. Manufacturers of wool tops, and wool or cotton yarn buy wool or cotton in the raw state. In that trade the tables would be turned and a low standard for regain would work to their advantage, but to the disadvantage of the producer or seller of the raw stock. Take raw cotton for example. In his interesting paper on the value of accurate testing, read at the Washington meeting of the American Cotton Manufacturers' Association, Dr. D. E. Douty, of the New York Conditioning and Testing Co., presented a statement of the moisture in American cotton as based on the U. S. Weather Bureau's record of temperature and humidity in the South during the ginning season. The average regain was well above 10 per cent. of the bone-dry

weight, and Dr. Douty gave an example of a sale of 100,000 pounds of cotton ginned during the second week of October when the regain averaged 14 per cent. As a result the 100,000 pounds of cotton weighed 5,703 pounds more than it would have weighed with the proposed allowance of 7 1/2 per cent. for moisture, and at 12 cents a pound the purchaser is represented as having lost $684.36.

This exhibit may be very convincing to the buyer of cotton, but it is not likely to arouse the enthusiasm of the Southern cotton planter and dealer. The cotton trade has been developed under the conditions of temperature and regain disclosed by Dr. Douty and which represent a moisture regain of 10 to 14 per cent. Prices are based on that regain and it is not difficult to imagine the reception that the Southern trade would accord to the proposition that raw cotton be invoiced at the reduced weight represented by a regain of 7 1/2 per cent. It is not at all likely that the European standard of 8 1/2 per cent. would be acceptable to the Southern trade, to say nothing of 7 1/2 per cent.

The intensity of the probable opposition from the South will be realized when we consider that on a 16,000,000 bale crop a difference of 1 per cent. in the allowance for regain means a difference of 160,000 bales of cotton, valued say at $8,000,000, while the difference between the 10 per cent. disclosed by Dr. Douty and the proposed standard of 7 1/2 per cent. would amount to $20,000,000 on a crop of that size. Farther north a lower standard would be nearer the average normal regain, but the establishment of 7 1/2 or 8 1/2 per cent. as the standard in the South is a hopeless undertaking.

A SUBJECT FOR INVESTIGATION

These considerations lead to the conclusion that the adoption of American standards of regain for textile materials is an exceedingly complicated and difficult problem which deserves far more consideration than it has thus far received. In view of the conflicting interests involved, the desirability of uniformity between foreign and American standards, and the confusion and loss that will result if a mistake is made, the question of American standards of regain for textile materials should be referred to a committee representing all branches of the trade and provided with means for collecting data bearing on the question. Such a work would require a liberal amount of time and money, but, if well done, the outlay would be a most profitable investment.

—:—

Julius Forstmann on the Woolen Schedule

An interesting contribution to the tariff discussion was made last month by Julius Forstmann, of Forstmann and Huffmann, Passaic, N. J., his statement reaching us too late for comment in the April issue. At the beginning of his statement Mr. Forstmann pointed out that the hope of developing a foreign market is a delusion.

> My experience proved that woolen goods are sold only to any extent in temperature climes and in countries where civilized garb is worn. No market for woolen goods for clothing can be found in tropical climes, where cotton and linen goods form the everyday wearing apparel; or in the far north, where furs are preferred. In countries like China and Japan tradition clings to other materials, such as silk or cotton, and as far as woolen goods are concerned, Japan is now fast equipping herself to supply at least her own requirements and those of her immediate neighbors. The theory of the development of foreign commerce is very fine, but it has its limitations. It must not be applied to industries which are not susceptible of development in that direction. The possiblities of exporting woolen goods are very limited. The only export market for American woolen goods worth cultivating would be in Europe, where the industry is very much older and more developed than in the United States, and with the mills of which American mills cannot even compete at home under free-trade conditions.

Mr. Forstmann vigorously combatted the views of Secretary of Commerce Redfield:

> When the tariff question first came up, I had the pleasure of having Mr. Redfield at our mill, and went over all the different points with him. He is, however, so enamored of his efficiency theories and so thoroughly convinced that what is true of the industry with which he has had experience can be applied to all, including wool manufacturing, and he is so infatuated with the policy of building up our export trade at the cost of everything else that it is impossible to argue the question with him. As in the case of our industry, so in all his speeches and writings—witness his recent outbreak regarding the cotton manufacturers—Mr. Redfield

shows an inexcusable bumptiousness in delivering himself ex cathedra on subjects about which he is most superficially informed. It is most unfortunate that the idea of a man like Mr. Redfield, who is manifestly carried away by his enthusiasm along certain lines, should be given serious weight in the framing of the tariff policy of a country like the United States.

At one point Mr. Forstmann attacks the decision of the Ways and Means Committee to place a flat rate of 35 per cent. ad valorem on wool goods regardless of the quality or value per pound:

In the recommendation of a flat rate on partly and wholly manufactured woolen products, a fundamental mistake has been made. This flat rate is wrong from every point of view. It is wrong because of the greater cost of manufacture of fine fabrics, fully explained in my brief to the Ways and Means Committee. It is wrong from a fiscal point of view, because it needlessly sacrifices revenue. The Ways and Means Committee, in the explanation which accompanies its proposed tariff bill, has laid great stress on the policy of differentiating between luxuries and necessities—which was one of the main points of my argument. While the Committee, however, has endorsed all I said in my brief about the propriety of the higher taxation of luxuries and has followed this policy with reference to many schedules, it has absolutely ignored it in the woolen schedule and has stultified itself by deliberately and wilfully avoiding the logic of its own conclusions which would have led it to retain a higher duty upon the finer wool manufactures. In this the Committee has ignored even Democratic precedent, for the Wlsion Bill of 1894 provided two rates—for yarns above and below 40 cents per pound and for fabrics above and below 50 cents per pound.

If the object of a tariff is to place the highest rates on the highest priced goods for the purpose of making so-called luxuries bear the chief burden, a sliding scale by which the ad valorem rate increases with the value per pound is of course the way to accomplish that object, for it is the price that makes a fabric a luxury. The difficulty with this plan, however, lies in the fact that the increase in the rate tends in itself to convert necessities into luxuries, which is far from desirable. The other theory on which such a sliding scale is based is that the proportionate conversion cost and, consequently, the need of protection increases with the value per pound, and that the requirements of protection can be met only by increasing the rate as the value per pound rises. The difficulty with this theory so far as wool goods is concerned is that it is not true. An increase in price is probably an indication of an increase in the proportionate cost of many manufactured materials, which in their raw state are fairly uniform in quality and value, such for example as certain metals and cotton. Wool, however, is a marked exception to this rule, because of the great variation in the quality and cost of the raw stock. Because of this variation the tendency in wool goods is for the proportionate conversion cost to decrease as the cost per pound increases. This tendency is by no means uniform owing to variations in the construction of fabrics made of the same material, and on an average will probably be found to be very slight.

Mr. Forstmann says:

As it is purposeless for any man to criticise without offering a substitute and as there seems to be little likelihood of my previous rates being accepted, I have again carefully considered the matter of rates, and would suggest that in view of the rates proposed by the Committee, it might be better, as a matter of compromise, to simplify my proposed rates by rounding them off as shown in the following table. Should Congress finally decide to place a duty on wool, the rates on wool manufactures suggested below ought to be correspondingly raised to compensate the manufacturer for the duty on the raw material.

The Forstmann schedule, based on free wool, provides for 15 per cent. on tops; 20 and 25 per cent. on woolen yarn according to yarn count; 25 to 70 per cent. on worsted yarn according to yarn count, and 45 to 60 per cent. on cloths according to value, the rates increasing with the count or value.

Mr. Forstmann makes a vigorous recommendation that the new rates on goods shall take effect some time after the rates on raw materials:

Manufacturers are now making goods for Fall delivery—from August to October and November. The raw material for all these goods has been bought at present prices, based on present duties. If any tariff change takes place before delivery of these goods, values will be radically upset. The trade as a whole cannot stand such sudden, wholesale cuts in values, and the result cannot fail to mean embarrassment for many firms; and once such conditions arise, no one can foresee how far they will go. If imports at lower rates are made possible before the close of the Fall season, there is no way by which a heavy loss can be avoided on goods now being manufactured on the basis of the present rates on raw material, and this loss will affect the whole trade—manufacturers of cloth, jobbers, manufacturing clothiers and retail merchants of cloth and clothing, with the thousands of employes depending upon the various branches of the trade for their living. Whatever duties are adopted on manufactures of wool, they should not go into effect until at least six months after the President has affixed his signature to the bill.

Equalizing Tariff Rates

The opposition to the Underwood tariff on textiles is based on the belief: first, that the rates are too low; and second, that they are not properly apportioned on raw materials, partly manufactured products and finished goods. Last month we gave our reasons for the opinion, which we have had no occasion to alter, that the sudden change from the high specific rates of the Payne tariff to the low ad valorem rates of the Under wood bill is calculated to work injury to many branches of the textile industry, and that the part of wisdom is to make a more moderate reduction at the first step in tariff revision.

We desire now, however, to make some suggestions regarding the equally important problem of a proper equalization of rates on the raw, partly manufactured and finished products. In no branch of the textile industry is there greater need for such equalization than in wool manufacturing and for that reason we will take our illustrations from that branch of the business, although the principles involved apply to all branches.

SUBDIVISIONS OF THE INDUSTRY

Wool, tops, yarn and cloth are the four principal commercial products in wool manufacturing. A manufacturer may convert wool into tops, yarn or cloth, tops into yarn or cloth, or yarn into cloth. Thus wool, tops and yarn are raw materials, while tops, yarn and cloth are finished products for certain manufacturers. Under such conditions it is clear that irregularities in the adjustment of duties may easily give rise to special privilege for some mills and discrimination against others. Too low a duty on tops as compared with wool puts the domestic top maker out of business and stimulates the importation of foreign tops. On the other hand too high a duty on tops as compared with yarn or cloth places at a disadvantage the mills converting tops into yarn or cloth. If the duty on yarn is too low as compared with wool or tops the tendency is to drive the domestic spinner to the wall, while too high a duty on yarn is a burden on the mills buying yarn and converting it into cloth. Too low a duty on cloth stimulates the importation of the finished product to the disadvantage of manufacturers of tops, yarn and cloth.

DIFFERENCE IN COMPETITIVE CONDITIONS

Thus arises the need of equalizing duties by which the various branches of the business will be placed on an equality so far as the protection afforded by the tariff is concerned. As the advantage or disadvantage from unequally adjusted rates results from the lower cost of production in foreign countries, it follows that rates fair to all domestic mills can be obtained only by so adjusting them as to equalize this difference between foreign and domestic conditions in the various departments of manufacturing. This is the theory on which the difference in cost scheme of tariff revision rests. Sound though that theory unquestionably is for products for which natural conditions in this country are adapted, it is obviously impracticable for a number of reasons, only one of which need be mentioned here, namely, the impossibility of determining the foreign cost of production. The recent attempt of the government to determine the difference in the cost of production served only to illustrate the obvious impossibility of the undertaking. Nevertheless it remains true that the tariff on raw, partly manufactured and finished products can be made fair to the various classes of domestic producers only by adjusting the rates to the difference in competitive conditions in the respective departments of manufacturing.

How best to do this with the difference in cost unknown and unknowable is the problem to be solved. It is a fair assumption that the ratio between foreign and domestic cost is approximately the same in converting wool into tops, tops into yarn and yarn into cloth. If then the rates on the various products are fixed in proportion to the domestic cost of production it follows that, while the rates may be more or less than is required to equalize conditions between foreign and domestic producers, they will leave the various classes of domestic manufacturers, top,

yarn and cloth makers, on terms of equality with one another. The problem is thus reduced to the determination of the domestic cost, which is by no means an easy task.

Cost varies from mill to mill, from week to week and from year to year. No one will ever see two rain storms exactly alike, and likewise no one is likely ever to find cost the same in any two woolen or worsted mills, or in the same mill during any two periods. The variation of rain storms, however, does not prevent the measurement of the rainfall or the compilation of statistics of precipitation which afford a fairly reliable guide as to what quantity of rain to expect from year to year in a given locality. And so with the study of domestic costs, the constant fluctuations need not prevent making records of costs and of determining facts, whose value in the adjustment of tariff rates will be in proportion to the extent of the observations and the intelligence and care with which they are made.

RELATIVE COST OF TOPS, YARN AND CLOTH

Coming now to the practical application of the proposed method of equalizing tariff rates, let us take for illustration the cost of converting wool into a given quantity of tops, of converting the tops into yarn and the yarn into cloth. At the recent tariff hearings C. Brooks Stevens, of the U. S. Bunting Co., Lowell, Mass., presented by request of a member of the committee a statement of the cost of manufacturing tops, yarn and cloth, from which we obtain the following figures for the American cost of converting wool into 1,000 pounds of tops and the tops into yarn and cloth:

	Conversion Cost	
1,000 lbs. tops	$60.00	10.5%
950 lbs. yarn	180.50	31.5
855 lbs. cloth	361.66	58
Total	$602.16	100 %

The Tariff Board in its report on schedule K gave a statement of conversion cost for a fancy worsted, which shows this result:

	Conversion Cost	
1,000 lbs. tops	$55.46	7.5%
880 lbs. yarn	188.32	25
796 lbs. cloth	507.05	67.5
Total	$750.83	100 %

In our issue of April, 1909, we gave a statement of the labor cost of converting 10,000 pounds of grease wool into cloth, which shows this result:

	Labor Conversion Cost	
5,655 lbs. tops	$155.00	11%
5,090 lbs. yarn	417.00	29
4,425 lbs. cloth	862.00	60
Total	$1,434	100%

The three statements, which are in substantial agreement, show that of the total cost of converting a given quantity of wool into worsted cloth, the cost of turning the wool into tops accounts for approximately 10 per cent.; converting tops into yarn, 30 per cent.; and manufacturing the yarn into cloth, 60 per cent.

ADJUSTING DUTIES TO COSTS

Accordingly a thousand dollars expended in converting wool into worsted cloth is distributed as follows:

	Distribution of Cost	
Wool into tops	$100.00	10%
Tops into yarn	300.00	30
Yarn into cloth	600.00	60
Total	$1,000.00	100%

The only way to avoid discrimination and special privilege between the three classes of manufacturers is to make the proportion between the duty on tops or yarn and that on cloth equal to the proportion between the conversion cost of tops or yarn and the total conversion cost of the cloth. This would make the duty (not the ad valorem rate) on tops 10 per cent. of the cloth duty and the duty (not the ad valorem rate) on yarn 40 per cent. of the cloth duty.

Assuming for the purpose of illustration only, that a duty of $500 is imposed on cloth for every $1,000 of conversion cost, the equitable adjustment of duties to costs would be as follows:

	Tops	Yarn	Cloth
Equalized duty	$ 50	$200	$ 500
Cost of conversion..	100	400	1,000

We come now to what bears directly on the present situation, a comparison of duties equitably adjusted to conversion costs of tops, yarn and cloth, with the duties which the Underwood bill proposes for those materials. Before making this comparison it is

necessary to distinguish between aggregate duties (with which we have thus far been dealing) and ad valorem tariff rates. An ad valorem rate on tops is based on a lower valuation than a rate on yarn made from the tops. The valuation of the yarn is in turn less than that of the cloth. It follows that in order to adjust the ad valorem rates on tops and yarn so as to give an equitable adjustment of aggregate duties to costs, it is necessary to allow for the increase in the value of the material as the process of manufacture advances, by making the ad valorem rates on each partially manufactured product higher proportionately than the rates on the products of succeeding processes. In order not to burden this examination with excessive detail we will content ourselves with stating that, in giving the aggregate Underwood duties on tops and yarn in the statement which follows, we have made allowance for this increase in the valuation in accordance with the most reliable data available.

EQUALIZED DUTIES AND UNDERWOOD DUTIES

Now to get a really comprehensive view of the proposed Underwood rates as they affect the top maker, spinner and cloth manufacturer, let us compare the conversion cost at each process of manufacture, the amount that the duty should be increased at each stage, and the amount by which the Underwood bill proposes to increase it. This statement is based on a conversion cost of $1,000 from wool to cloth and a duty of $500 on the cloth:

	Tops	Yarn	Cloth	Total
Increase in conversion cost	$100	$300	$600	$1,000
Equalized increase in duty	50	150	300	500
Underwood increase in duty	137	80	283	500

What would be thought of a commander who in time of famine orders that fifty of his men receive short rations for one hundred and thirty-seven; that one hundred and fifty of the men receive the reduced rations for only eighty; and that the remaining three hundred of the command have the short rations for two hundred and eighty-three? And yet, in addition to withdrawing all protection from the grower of wool, that is the way in which the Underwood bill as endorsed by President Wilson proposes to distribute the inadequate protection of 35 per cent. on wool goods between the three classes of manufacturers who convert wool into worsted cloth.

The obvious tendency of such a disarrangement of rates on tops, yarn and cloth would be to discriminate against the manufacturers with small capital converting tops into yarn or yarn into cloth, and to encourage the concentration of the business into mills in which raw wool is converted into finished cloth. That such concentration does not mean increased efficiency is indicated by the experience of England where under free trade conditions the highest efficiency has been reached by a subdivision of the worsted business into top making, spinning and weaving.

THE THEORY AND PRACTICE OF TARIFF REVISION

Such is the schedule K framed by the Democratic members of the Ways and Means Committee, who state in their report that the bill was framed with this object:

1. The establishment of duties designed primarily to produce revenue for the Government and without thought of protection.
2. The attainment of this end by legislation that will not injure or destroy legitimate industry.

Any tariff on imports is necessarily protective if the product can be made in the country imposing the tax. The claim to the contrary is mere pretense, which may help certain politicians to gain votes, but the attempt to frame protective schedules "without a thought of protection" results as a matter of course in the deformed tariff legislation illustrated by the woolen schedule of the Underwood bill.

Such is the schedule K formally approved by a Democratic President on April 6 and in whose personally delivered message to Congress on the next day are found these words:

> We must abolish everything that bears even the semblance of privilege or of any kind of artificial advantage, and put our business men and producers under the stimulation of a constant necessity to be efficient, economical and enterprising, masters of competitive supremacy, better workers and merchants than any in the world.

Compare the presidential promises with the woolen schedule that has received the presidential approval.

In all probability the conflict between the Underwood bill and the professions of its framers is not due to bad faith. The Democratic legislators and the President are, we believe, sincerely anxious to frame a tariff law without special privilege and without injuring legitimate industry. That they have failed at the start in the schedule on which public attention has been focussed for four years is plain. This failure is doubtless due, not to intention, but to a lack of knowledge of the industry, to an excessive devotion to the practice of generalization and to the consequent neglect of detail. Now, however, the election campaign is over, the President and Congress are in authority, and the time has come for them to abandon academic generalizations and face the industrial problems which they have promised so confidently to solve.

FORTY-FIVE YEARS AGO

Taken from the files of the Industrial Record, now the Textile World Record.

We have in our library the complete files of the Textile World Record, formerly the Industrial Record, from 1868 down to the present time.

The Industrial Record was the first textile journal published in the world, to our knowledge; certainly it is the only one which has preserved a continuous history for forty-five years.

It has been interesting to us, and we think it will be to many of our readers, to look over those files to the time when the textile industry in America was beginning to expand.

It has been suggested that we reprint some extracts from those old files from time to time. The following items are taken from the issue of 1868 and 1869.

Some of the old questions were then discussed as now. The tariff was a live issue and American manufacturers complained then, as they do now, that American goods were frequently sold under foreign labels. Twenty-nine cents a pound for cotton and 58 cents for XX Ohio wool look like big prices to us.

The first worsted mill in the United States was just starting up while some of the mills that were mentioned then as important enterprises are no longer in existence and are almost forgotten.

August 1, 1868. The Utica (N. Y.) Steam Woolen Co. has a fine line of cassimeres on sale with A. T. Stewart & Co.

August 1, 1868. The Harris Woolen Co., Woonsocket, R. I., will have their new goods in for the fall trade.

August 1, 1868. The Bennington (Vt.) Woolen Co. are gaining a favorable reputation for their shawls.

September 10, 1868. The first loom on fancy cassimeres in the United States was started at the Middlesex Mills, Lowell, Mass. The weaver in charge was Miss Hancock.

October 15, 1868. Letters go to any part of the United States for three cents per one-half ounce, if prepaid.

October 15, 1868. Meeting of the National Association of Wool Manufacturers. Emergency measures were taken to meet a deficit of $2,000. Mr. Robinson, a woolen manufacturer of Maine, claimed that cloth cases should be charged to the commission houses and to the customers.

October 15, 1868. Middling Uplands cotton, 25 1/2 cents at New York, XX Ohio wool, 58 cents at Boston. Canadian combing 72 1/2 cents at Boston.

October 15, 1868. A $100,000 fire at the Washington Mills, Lawrence, Mass.

December 15, 1868. The Lowell Mills adopt a working schedule beginning at 6.30 A. M. and closing at 6.30 P. M., Saturday excepting, averaging 11 hours per day.

October 15, 1868. Death of Alexander Oakley of New York, the oldest active member of the woolen trade in the United States.

March 1, 1869. The New York wool goods trade, which first settled in Pine St. and later in lower Broadway, is now centered at Park Pl.

March 1, 1869. Walter Brown & Co. held a successful wool auction in New York.

March 1, 1869. Middling Uplands cotton at New Orleans, 29 1/2 cents.

July 1, 1869. The Washington Mills, Lawrence, Mass., expect to beat the French poplins when they get their new worsted mill ready.

The Annual Convention and Exhibition National Association of Hosiery and Underwear Manufacturers

The ninth annual convention of the National Association of Hosiery and Underwear Manufacturers was opened in the convention room of the First Regiment Armory, Broad and Callowhill Sts., Philadelphia, by President Charles E. Leippe soon after ten o'clock on Tuesday, May 6th. There was a large gathering of manufacturers present at this session and at all the sessions of the convention.

In the absence of Mayor Blankenburg, Commissioner of Works Porter gave the official welcome from the city to the visiting manufacturers. The Mayor's secretary, Mr. Cattell, followed with an interesting address, urging the manufacturers to be hopeful and optimistic for the future in spite of what they might think were the immediate signs of depression. He believed that the country was so big and its citizens so energetic that they would be able eventually to overcome any temporary obstacles placed in their way. Mr. Cattell's words of good cheer were well received by the audience and a vote of thanks was passed to the Mayor and his representatives for the city's welcome.

President Leippe then delivered his address, which follows:

We wish to extend to you our hearty greetings upon this the opening of the ninth annual convention of the National Association of Hosiery and Underwear Manufacturers, with the hope that this may be the largest and most beneficial convention the association has yet held. We trust that the time at the convention and exhibition will be well and profitably spent, so that when you return home you will be better fortified to fight the battles of business and business preservation on account of knowledge acquired here.

The business year just closed has been a good year for most of us. Possibly, on account of the high cost of materials and scarcity of help, not nearly as profitable as many of us would have desired, but taking it as a whole a good year.

Since holding our last convention there has been a radical change in the policy of our national government. The policy of the party now in power has never been along the lines of tariff for the protection of American industries, but rather along the lines of a tariff for revenue only. Some of the older members of this association remember with a great deal of regret the shipwreck made to business by this idea of a tariff in times gone by, and cannot see now how high American wages can be paid under a low tariff on foreign.

The knit goods industry has never in its history been over-protected. It is one of the very few industries that is not controlled by a trust or combination of any kind or character. The policy of the present administration, if carried out along the lines as laid out at present, will injure the American knitter and his employes, and will not benefit anyone but the foreign manufacturers and a few importers. I do not believe that the American consumer will be benefited at all; because the consumer on account of internal competition is buying better values at less money than the consumers of hosiery or knit goods of equal quality in any other part of the world today.

Why should such a great industry be put in jeopardy? Echo answers, Why? You can rest assured, however, that our tariff committee with our tariff expert will do everything in their power to get as high rates as it is possible to get, and if the members of our association are called upon by our tariff committee to do some work among their congressmen or senators I hope it will be done promptly and with a will.

The tariff laws, however, are not the only troubles the knitting industries seem to have at this time. Each individual state seems to be vieing with its neighbor to see which can pass the most progressive, up-to-the-second laws. These progressive law makers are egged on by a lot of paid secretaries of women's clubs and welfare associations, who are well meaning, but who have no personal experience with these matters. The laws are written by men with university educations, but who have admitted in my presence that all they know of the real conditions of labor is only what they read in books or are told by some of these faddists. Common sense seems to have taken wings, and we seem to be on a wage of legislative insanity. State rights seem to be an error as far as labor laws are concerned. All labor laws should be national laws, then all states would be on the same footing. Our national law makers, if they undertake this task, should pray for wisdom and bear in mind that they cannot make man good or change his nature by amendments to the consti-

tution or by resolutions. Neither can you legislate for all the ills man is heir to. There is not a scarcity of laws. If Congress and the various State Legislatures would adjourn and not meet again in 20 years, I believe there would be national and state laws enough untried to last 20 years more.

Under present conditions business does not have time to adjust itself to a certain law until that law is changed or repealed, and a new one put in its place, only to take the same course as its predecessor. This multiplicity of conflicting laws make a lot of law breakers. If things continue along this so-called advanced line, every law-abiding employer who employs a man or woman besides himself will have to employ an expert to interpret the new laws to keep himself from going to jail or having his property confiscated in the shape of fines. It is about time that the manufacturers and business interests of this country take an active part in politics, and in the selection of men to represent them and their interests in various state Legislatures and in the National Congress. We have been standing aloof much too long, and have been letting the professional politicians run politics and the country to suit themselves.

There will be a reaction, but in the meantime business interests pay the piper. For that reason business of every nature, kind or character should get together. Whatever legislation benefits business, benefits every minute part of that business. By that I mean everything connected with it in any way, shape or form. Every officer, clerk or employe of a business is vitally interested in the success of that business. If there is no business there will be no work, and if there is no work there will be no bread. These parasites who make their living off the business interests, running up and down the land trying to breed discontent between the employes and the employers will then be out of a job, and will have to do honest work or go to jail.

CHARLES E. LEIPPE, RE-ELECTED PRESIDENT OF THE ASSOCIATION

This thought I hope you will take home with you and ponder over it carefully and thoughtfully, as it is a condition that we must face. The sooner we meet it and put it into execution the better for all business interests.

The reports of the Secretary and their routine business were carried over until another session.

Charles Vezin addressed the meeting.

THE QUID PRO QUO OF THE HOSIERY INDUSTRY

BY CHARLES VEZIN

In his speech at Staunton, Woodrow Wilson said, "In future no man will be permitted to get rich without giving a quid pro quo." In other words, he must render services in return for what he gets. The hosiery manufacturer is no less selfish, no more altruistic, than anybody else. I am simply going to state facts. These facts should prove that the tariff legislation now threatening our industry is unjust, undeserved. One of the largest clothing stores on Broadway—one of the biggest advertisers in New York—retails at 50 cents a pair a boys' stocking which we sell at $1.75 per dozen to a jobber. It pays the jobber $2.10. I went into a furnishing goods store to buy some collars and the clerk called my attention to their special bargain sale of socks at three pairs for a dollar. It was a 220-needle lisle sock on which any of you gentlemen would be delighted to run your whole mill and never make anything else at $1.50 per dozen.

You have been unjustly accused of many sins. The Tariff Chamber of Horrors, during the last political campaign, had in its window stockings figured out to cost 9 3/4 cents per pair to make, retailing at 25 cents per pair. But why blame the manufacturer for that any more than blame him in the above mentioned two instances? Does anyone blame the farmer who gets 3 1/2 cents per quart for milk because the consumer has to pay 9 cents?

It is safe to say that the average profit to the manufacturer of domestic hosiery is considerably less than one cent per pair. I believe it is not over half a cent per pair.

Twenty years ago most domestic hosiery had big seams, had no durability, and fast dyeing was unheard of. When the first seamless goods appeared they were coarse gauge, stiff, harsh, and fast color was unknown. The first trip I made with domestic hosiery I showed a woman's 120-needle hose at $1.75, with a black that left the skin of like hue. It was snapped up by every buyer who saw it. Much better and finer goods, elastic and fast black, are sold today at less than half that price. About the same time I showed a 160-needle half-hose at $1.50, the same fugitive dye—an article not as good as you can buy today for 70 cents. I could give many other items of this nature. We have progressed, until today we furnish mercerized lisle 240-needles, fast black, double sole, high spliced heel, double welt, as cheap as was the coarse article of twenty years ago.

Statistics show a slightly higher average price for domestic hosiery since the passage of the Payne-Aldrich bill. This does not mean that the domestic manufacturer has advanced his prices. On the contrary, taking the same values, prices are lower. The increased average price is due to the fact that under the beneficent effect of adequate protection the domestic manufacturer has been able to make more of the 25-cent and 50-cent grades, instead of the 10-cent and 15-cent grades.

The party in power was elected by considerably less than half the total number of votes cast. The present tariff legislation is therefore the expression of the will of a minority and does not represent the sentiment of the majority of voters. I am firmly convinced that if the issue could be plainly put before the voters to be decided on a purely economic basis, eliminating all political bias, that the Underwood bill in its present shape would be defeated.

Woodrow Wilson and other Democrats have repeatedly said that legitimate enterprise need not fear. Yours are legitimate enterprises. You have no trust, no combination to keep up prices, to put restraints on trade.

I do not claim that a tariff should never be reduced, nor do I claim that the reductions in some of the schedules are not proper.

But I do contend that the obligations incurred by a nation should be binding upon any party in that nation in this instance to the extent that these questions should be decided upon a basis of the findings of a scientific non-partisan tariff board.

To theoretically help one part of the community, certain sections of the country, indifferent to the acute distress and absolute disaster caused in other sections, is poor patriotism.

Years ago some states repudiated their bonds because the party in power did not approve of the way the money had been borrowed and spent, thus defrauding the innocent investor in these bonds. To ruthlessly tear down the levees of protection, indifferent to the disaster wrought, is as cruel and unjust.

Fred W. Simons' paper followed.

ARBITRATION

BY FRED W. SIMONS

One of the first essentials of civilized government is to make provision for arbitration—trial by jury—which as you know is incorporated in the constitution of the United States, and which for five centuries before the creation of that instrument had been regarded as one of the greatest safeguards to human liberty. It is so regarded today and will probably continue to be so regarded as long as human government exists. We have no choice as to whether we shall arbitrate or not. Unfortunately when it comes to international disputes we have no magna charter or Constitution or international authority to prescribe the character of the tribunal of arbitration, so we resort to the "arbitrament of the sword" and accept the verdict, that the litigant who is most proficient in the diabolical arts of wholesale murder and destruction is in the right.

And yet we have seen men of great intelligence, men whom the nation has delighted to honor, defeat the ratification of arbitration treaties negotiated by our own government, on the plea that "you can't arbitrate a question of honor."

Gentlemen, it is no use mincing words about this thing; some kinds of honor stink and we never learn what real honor is until we have gotten rid of the stinking kind. We put out conceit and our vanity and our selfishness on a pedestal and call it honor; and, of course, you can't arbitrate that; the only thing that you can do with it is to rip it up by the roots and let it die.

We shall, of course, never be able to dispense with the rigid enforcement of the law until we render willing obedience to the law. But this fact only emphasizes the importance of keeping ever before us the end for which law exists and if we can accomplish that end without appeal to the law, then the law is not destroyed but fulfilled. Hence the great possibilities for usefulness open to voluntary arbitration.

What can business men with their organizations do about it? Well, they can do a great deal. They can show the way. They can set up tribunals of their own, which for the disposition of certain cases will be more efficient than the courts, because they will be composed of men having technical and practical knowledge relating to such matters as they may be called upon to adjudicate; and because they may dispose of them solely upon their merit, being unrestricted by precedents or by any conflict between law and justice, and it is justice not law we all want—is it not?

The rule is that if you have a remedy at law you have no case in equity, and it may be a wise rule, but thousands of cases go to juries that never ought to go to them, because the average drawn jury is not competent to properly decide them, and they should either be decided by the bench or referred to competent arbitrators.

We all know how annoying law suits are and how frequently justice miscarries. Its a common saying amongst lawyers that "you never can tell what a jury will do," and in trade disputes they so frequently do the wrong thing that it would be superfluous for me to cite instances. This is no reflection upon the integrity of the courts nor upon the intelligence of juries. It is simply because they are frequently called upon to decide questions which by reason of their lack of technical or special knowledge they are not competent to decide.

To illustrate by a figure we can all understand, how are twelve men who know nothing of yarns or spinning or knitting going to properly adjudicate a dispute between a knitter and a spinner as to the quality of yarn delivered; especially after they have had it all explained to them by two lawyers who don't know anything about it? They can't do it, and if they do render a just verdict they arrive at it by chance or intuition.

On the other hand, suppose that such a dispute is referred for settlement to a court composed of two members of the arbitration board of the Knitters' Association, two members of the arbitration board of the Spinners' Association, and one member from the arbitration board of some allied trade. I submit that you have a competent court.

Of course, everything depends upon your arbitrators being honest men, but you have to take that chance anyway. You can't reasonably expect that a common jury will be of more than average honesty, but you can reasonably expect that a trade association will select for its permanent arbitration board men of standing and character; and I for one would be quite willing to submit to the decision of such a court, believing as I do that our successful business men are not only of exceptional ability but also of exceptional integrity—all reformers and big stick wielders to the contrary notwithstanding.

It may be objected that business men have frequently tried arbitration in the past and not always with satisfactory results. This is true, but such failures may generally be explained on the ground that such cases have not been tried by competent unbiased arbitrators, the parties at interest having themselves appointed a majority of the tribunal; each litigant selecting one arbitrator and the two so selected a third. In substance this practice amounts to each litigant selecting an advocate and the two advocates selecting a judge; and the result depends largely upon which litigant has selected the abler advocate, just as the results of law suits frequently depend upon which side has selected the abler lawyer.

The litigants should have no voice in the selection of the arbitrators. What we need to settle disputes between business men is an unbiased tribunal composed of business men of high standing, competent by their own knowledge and experience to pass upon such cases as may be brought before them, and I believe that if such a tribunal were available nine business men out of every ten would prefer to appeal to it rather than to the courts.

The question is, can this thing be accomplished? I think it can, and it seems to me that the task of doing it falls legitimately and naturally upon the shoulders of the trade organizations.

The morning session was brought to a close by a most interesting address of very practical import by Morris Wolf, an attorney of Philadelphia.

SOME CAUSES OF SMALL DIVIDENDS IN BANKRUPTCY CASES

BY MORRIS WOLF

That dividends are small in bankruptcy cases is a business axiom. The average merchant no more expects a large dividend out of a bankruptcy case than he would expect an ostrich out of a robin's egg. In the twelve months ending July 1st, 1911, there were liabilities in the bankruptcy cases then closed amounting to $165,014,725.93. The total dividends paid in these cases amounted to $26,099,453.29, so that creditors lost $138,915,272.64.

In the cases closed during the next twelve months, ending July 1st, 1912, the liabilities amounted to $170,153,496.75. The dividends were $22,891,891.27, so that creditors lost $147,261,605.48; almost $150,000,000 in each year. This, of course, does not include the many settlements of insolvent debtors made outside of bankruptcy. The

money thus lost is more than twice as much as the proposed federal income tax is expected to yield.

The unsecured creditors, and that includes you—what mere merchant ever held the enviable position of a secured creditor—received about 14 1/3 per cent. of their claims in the cases ending in 1911, and about 12 1/3 per cent. of their claims in 1912. In our Eastern District of Pennsylvania the dividends were under 10 per cent.

In these days when economists are turning their X-rays on every part of the commercial body in order to see what preventable waste there is, it is a wonder that this tremendous drain of almost $150,000,000 of losses each year has been commented upon so little. Need the great consuming public be reminded that IT must pay for the losses sustained in bankruptcy cases?

Tested by its results the bankruptcy act has been found wanting. To the honest but unfortunate man it has been a most charitable statute, as it should have been; but to the dishonest and fraudulent man, it has been scarcely less charitable. In the ancient days of imprisonment for debt, the unfortunate debtor frequently suffered punishment fit only for the dishonest debtor. In our day the dishonest debtor is enjoying immunities fit only for the honest debtor. The growing spirit of hostility to wealth and vested interests has had the effect of substituting for the harsh old rule: "Let the devil take the hindmost," the scarcely less hard rule: "Let the devil take the foremost." It is all very well to speak sympathetically of the man who cannot pay his bills, but it should not be forgotten that the result of his failure to pay his bills may be that some of his creditors will be reduced to misery and want.

I do not believe that any amount of legislation can prevent men failing. As long as goods are sold on credit, a certain amount of mortality is as inevitable in the life of businesses as in the life of men, but I do believe that a sterner treatment of debtors would produce better results than those which I have mentioned.

Merchants, and even some attorneys who are not familiar with bankruptcy cases, imagine that creditors receive small dividends because the attorneys get all the money. This is not so. If there had not been one cent paid for attorney's fees in the cases which I have mentioned, the dividents would not have been 2 per cent. more. The trouble is not that the dividends do not represent a fair return from the assets, but that the assets are so small.

Concerning the punishment for violation of these provisions, I seriously doubt whether the refusal of a discharge in bankruptcy is a sufficient penalty. My experience has not led me to believe that the refusal of a discharge has the crushing and overwhelming effect upon a bankrupt which it should have. As long as business may be conducted in the name of wives or corporations, bankrupts will not be inconsolable if they are unable to do business in their own name. In the reign of Charles IX. fraudulent bankrupts were put to death in Orleans and Blois. I think that this is a trifle too severe. I am not sure, however, that our prisons and penetentiaries, sanitary and hygienic as they have been made, are not good enough for debtors who do not observe these provisions.

If these provisions are made effective by suitable legislation, it seems to me possible that great good can result from them. If debtors hand over their business to the creditors when their assets amount to at least fifty cents on the dollar, creditors should have a better chance to work out a fair dividend than if the debtors may continue until their assets are practically wiped out, and if the sale of goods below cost is checked, I conceive it possible that the days will have gone by when Receivers, upon being given possession of the debtor's assets will find these to consist only of empty packing boxes and prehistoric records and books of account scattered over the office floor.

At any rate, some change ought to be made in an effort to see if we cannot save for the people of this country part of the wasted $150,000,000 a year.

The afternoon meetings were executive sessions and the press requested to publish no reports. The seamless and full fashioned hosiery manufacturers and the underwear manufacturers met separately to discuss matters of particular interest to their branches of the industry.

There was some delay in opening the Wednesday morning session, as the Hon. J. Hampton Moore, of Pennsylvania, who had been expected to deliver the opening address, was detained in Washington by a tariff legislation, in which he was interested, and George H. Earle, Jr., announced as the second speaker on the program, opened the meeting with an extemporaneous address, which was listened to with marked attention by an audience that filled the hall to overflowing.

He spoke in part as follows:

THE CONSEQUENCES OF ASSASSINATING HOPE

By GEORGE H. EARLE, JR., President Real Estate Trust Co.

One constantly hears that "business is business." That is not a matter of sentiment at all, but simply a hard reason. I am here today to protest against that fallacy. For it is as great a fallacy as another remark that is receiving popular attention, to the effect that statesmanship consists simply of being elected to office.

These joint ideas, that statesmanship has no requirement except political success and that sentiment plays no part in business, are responsible for

the evil conditions that are now confronting your body.

But in the days when there was real statesmanship, when Abraham Lincoln was saving this country, he fully realized the underlying truth that successful production was chiefly founded upon hope. In discussing the slavery question on one occasion, he said, in substance, that the effects of hope upon human energy and human productions were simply wonderful; and illustrated it by pointing out that the slave whom fear of the lash could never drive to work seventy-five pounds of flax a day, would cheerfully turn out a hundred and fifty pounds when promised all he made over a hundred.

If the high cost of living is to come down and of you are to succeed, you must therefore see that the conditions of those who work for you are made more cheerful.

PERIOD OF STRESS

Now let us examine what is actually done. Under a humanitarian impulse, State after State, and I must not be understood as criticising them for so doing, are lessening the hours of labor; are restricting the toil that is put upon women; are placing restrictions upon the employment of cheap child labor; are requiring that manufacturers, in addition to paying wages, should take out insurance for their own employes; are requiring better and more expensive sanitary conditions, etc.

That the manufacturers of this country can and will adjust themselves to these new requirements is my firm hope, but anyone who has had business experience must understand that a period of stress and of adjustment is involved in such radical changes.

And yet at this very time when this radical departure is being made, those in authority will only look at one side of the ledger and see what they can take from the producers, and not count where it is to come from; and we have the spectacle of all these additional requirements being made to compel American labor and American manufacturers to compete, without protection, with countries that are making no such advances and where production can continue on the cheaper basis. How these people, therefore, are to get their insurance and their wages seems never to be considered. Where they are to come from no one even inquires much less suggests.

UNCANNY TAXES

But this is not all. With this double danger confronting them, human ingenuity is being exhausted by the people who don't produce anything but simply hold office and talk, to suggest new, uncanny and unheard of taxes.

These industries, struggling under a period of adjustment, of forced competition with people who don't have to adjust, are told day by day that every sort of new taxation may be imposed upon them. To raise more revenue we are to have an adjustment of assessments, which, of course, means higher assessments. We are to have a higher tax rate. We are to have taxes on vaults, taxes on automobiles, taxes on furniture, taxes on signs, taxes on occupations, and actually a tax that amounts to little less than a fine upon anyone who has the temerity, under existing conditions, to dare to make anything in Philadelphia.

Gentlemen you laugh, but I have not exhausted the scale yet. And not only are we to have all these things, but when Councils stand steadfast and refuses at such a period of stress to put any or all of these new burdens upon the industries upon which the city must live and prosper, if it is to live and prosper, something that has never before happened in its history has taken place, and a town meeting has been called to denounce those whose action I believe has been necessary for the salvation of the city. I do not wonder that you laugh, but it is not a laughing matter. What are you going to do under all these new burdens and experiments, if you are to be forever additionally burdened and nowhere helped?

ASSASSINATING HOPE

Gentlemen, we have come back to the point at which we started. We expect prosperity. That can only come where there is hope, and we are "assassinating hope" with might and main. But there is a better side to this. If it brings you in closer contact, as it is sure to in a little while, with the people who work with you in your mills; if it makes the men without whom you cannot succeed understand that the people who actually pay them wages are not their enemies; if you wish them to take up the question of how you are to pay them, if the city one way or another makes you compete with cheaper labor and increase your cost of production by increasing the burdens all the time —you will have a reaction that will insure you many years of prosperity to come.

And I do not believe that you are going to get it in any other way. Get close to your men. Make them understand that you are working not only with them, but for them. Give them full justice, and let them understand that you are sailing is the same ship; and these increasing burdens that are decreasing both your revenue and theirs, will not be of permanent duration.

In another connection, the lesson that we are getting now was beautifully expressed by one of the poets: "Sweet are the uses of adversity." For adversity teaches us by actual experience where we are traveling in dangerous directions.

It has been beautifully said, and in that you should find your solution, that—

> Hope, like the rainbow, a creature of light,
> Is born, like the rainbow, in tears.

And in these conditions, as disastrous as they are to your particular industry and to many others, hope is striving to live through the growing knowledge that employer and employe must in their mutual self-defense get together, be friends, and keep something for their joint benefit from those

who, under the name of "taxes," distribute an increasing part of the wealth of the country among those who only succeed in politics.

Mr. Earle was followed by Herbert N. Casson, connected with a prominent advertising agency in New York. Frank Finney, who was down on the program for an address was unable to be present, but certainly Mr. Casson proved an able substitute, for he kept his large audience intensely interested and amused for over an hour while he expounded the first principles of advertising in its relation to human nature and the selling problems.

His speech was extemporaneous and abounded with apt illustrations and humorous points as well as many sound suggestions.

Mr. Casson said that advertising was responsible for new and better standards of living, particularly in the line of sanitation and cleanliness, also with wearing apparel.

He urged specialization, saying that advertising was a profession in itself and could best be done by a different type of man from the successful manufacturer.

He said that too many manufacturers believed they were competent to handle this subject, but they were too close to their own business to get the right point of view. A man from the outside could get a better perspective and a well trained professional could bring to each manufacturer's business results of experience with other problems in which some of the same difficulties had been met and overcome.

"See your business with outside eyes," said Mr. Casson. "Make your goods the people's friends through advertising them. Newspaperize your business. If you do not appreciate advertising and display, you will keep on getting a cent where, by advertising, you would get a dollar. It is not the factory that makes the price on what you have to sell; it is not the raw material, but it is what you have in you to make the American people appreciate what you have to offer. The idea that has been so much talked of, that supply and demand are equal, may be all right as a general proposition, but the manufacturer who has a good supply of goods on hand need not flatter himself that an equal amount of demand is going to seek him out to absorb his supply. He has got to take his supply and go and find the demand, and advertising is the biggest factor in bringing this about.

"There are some general rules in selling goods and one of the first principles in the retail end is that only one out of every six sales goes into the retailer's pocket. The first four sales go to the manufacturer, the fifth goes to clerks and similar expenses and the sixth goes into his pocket. Every time you see a tobacconist smoking a cigar remember that it means six sales (laughter). The retailer who takes fancy underwear and similar articles home by the half dozen to his wife and family and thinks he is doing fine is making a mistake. He is losing money and does not know it."

Returning again to the subject of advertising especially from the manufacturer's point of view, he told them they did not know how to write an ad. "Most manufacturers," he continued, "write ads to please their wives. They have their own name in big type across the top of the page and take it home to show her and say, 'There, look at that. Look at my name. Who would ever thought that I would have done that when we started in the basement.' What they need is outside eyes to look at their business and see the things they can't see because they are too close to their business. An ad consists of three parts: the bait, the line and the hook, and if you say 'Casson sells underwear,' or 'Casson wants to sell underwear,' it does no good, because it looks as if you had a lot of merchandise on your hands you want to get rid of, or that you are sore at your own goods. 'Buy Casson's underwear' is better, but 'Can't you cut down your underwear bill?' is still better because it appeals to the individual, and it is the individual that must be dealt with and the manufacturer does not know how to do this because he is too busy at his factory.

"The top line must catch the public, the middle of the ad can be used to describe the goods and something to land them should be at the bottom. The head line is the most important and must catch the eye, and at the same time please it. What piece of music is so pleasant to hear as Home Sweet Home with variations. It is known to all, and the variations are pleasing, so in your head line you must give them Home Sweet Home with variations.

"The manufacturer must make his merchandise known to the public if he wants it to sell, but most of them are afraid. Gillette was not afraid to do this, however, and now people are paying $5 for a Gillette safety razor. If a man in Oshkosh made a razor and called it the 'Oshkoshki,' and some one asked you what razor you used, would you tell him? No! But you pay $5 for a Gillette which costs 40 cents to make, and you pay $4.60 to put out your chest and say you use a Gillette (laughter). So you want to get your merchandise known. Get the public acquainted with it. Take a man who has just arrived in New York. He walks along all day and does not meet anyone he knows until late in the afternoon when he meets some one from his home town. A fellow he would not walk across the street to speak to under ordinary circumstances. But now he is mighty glad to see him. Runs across the street, shakes hands, takes him out to dinner and will almost go his bond. Why? Because he knows him. There is the 'Hello Bill' attitude. That's what we do to merchandise. We put the 'Hello Bill' on it. Get the public ac-

quainted with it so that when it is shown them they recognize it and prefer it to something they never heard of."

He also touched upon the mistaken idea that people would not pay high prices and told the manufacturers that this was not true. That the public will pay high prices for something they are acquainted with was demonstrated by referring to several well known articles on the market. He also pointed out how the automobile manufacturers have educated the people to buy a new car every year and told of the enormous business done each year in this line alone. He claimed that cotton cloth and similar articles should not be sold so low and urged the manufacturers to get together, stop slashing prices and trying to beat the other fellow out by making their article cheaper and worrying over the cost of production. He said they should get together and work in unison, advertising their merchandise and not worry about whether or not the people will stand for the price.

At the conclusion of his address, Mr. Casson was given a great ovation, thanks being tendered, after loud applause, by a rising vote.

The next speaker was J. H. Schofield, of Sullivan & Co., representing the Jobbers' Association of Knit Goods Buyers.

EVILS THAT HAVE CREPT INTO THE JOBBING BUSINESS

BY J. H. SCHOFIELD

The jobber is the natural distributor and distribution is more expensive than it was years ago. This is one evil, not to speak of smaller and more frequent shipments. Another evil is the piker who poses as a manufacturer and who goes around selling goods in twenty, thirty or even sixty dozen lots to retailers whose output would demand not more than ten dozen, and whose credit is often affected by overbuying; and then at that they are paying these fake manufacturers always as much as and in some cases more than a jobber's price. This is another evil.

Cheap credit is another evil that works against the jobber who meets his obligations when due. This is an evil, because it causes over-solicitation, and causes manufacturers to be unable to make their deliveries on dates specified. And often they find that a good part of their product has been shipped to doubtful risks and they are compelled to settle for 25 per cent., when if cheap credit had been eliminated they would have received 100 per cent.

One of the points that is rarely considered and yet is of the greatest importance is that manufacturers of the highest sense of integrity, men whose word in financial matters is as good as their paper and whose paper is readily discounted by most discriminating banks, will put their name on an acceptance of an order when they have no prospect of ever making the deliveries at the time agreed upon in that acceptance. Manufacturers take orders for delivery of their spring product in the month of January when they know those deliveries will be strung out through the entire spring. Take for illustration an order placed by us with a local mill for delivery one-third in January, one-third in February, and one-third in March, of which none was received in January, one-third in February, none in March. Take for further illustration a southern mill, who when they were showing their samples in July, 1912, for spring delivery, were given an order for deliveries in January, February, March, April and May, 1913, and by the middle of April they had only made delivery of the January shipment and that was not made until the latter part of February. These instances could be multiplied and are not the worst examples. There are orders on the books placed in 1912 and accepted by the mills for January, February, March and April, where the January shipments were not completed by the first of April.

Perhaps it might be said these are hosiery mills, and that underwear mills do better than this, but is this the case? Let us examine some of them. . . .

The thought that I would like to place before the Convention is that mills doing this are working a hardship on the distributing end of the business, who send their men on the road at considerable expense to sell goods and who promise deliveries based on a reasonable time after the dates of deliveries accepted by the mills, and who then find when they come to live up to their end of the business that they cannot ship to waiting customers the expected merchandise, and all they can get at that time from the mill is a letter stating they will do the best they can.

Finally I would recommend that in all contracts the following be used: That in all cases where goods are not delivered within thirty days of dates specified that jobbers be permitted to buy their merchandise in open market and charge manufacturers 10 per cent. for same, and in all cases where contracts are cancelled by jobbers thirty days after receipt and acceptance of order has been received that manufacturers be permitted to charge jobbers 10 per cent. This I would consider equitable and would almost guarantee deliveries on dates specified. This would eliminate a great part of the evils that have crept into the jobbing business.

P. C. Withers, of the Illinois Knitting Co., Mt. Vernon, Ill., replied briefly to Mr. Schofield, and while admitting some of his statements, he called attention to another evil that should also be corrected, and that was the custom of jobbers overbuying, knowing that some of the goods ordered could not be delivered. This evil was the out-growth of the other evil of manufacturers accepting orders beyond their capacity to fill.

At the Thursday morning session the Secretary's report was read, also the report of the Board of Directors.

Fred W. Simons, chairman of the special committee to cooperate with the National

Chamber of Commerce, reported that he attended the annual convention at Washington.

Mr. Simons believed that this body had a great field of usefulness before it and that they had been most fortunate in securing Harry W. Wheeler for its first President and in being able to induce him to serve a second term.

He criticised some features of the organization, particularly the fact that at the convention meetings there is no vote taken on the arguments presented, so that it is difficult to arrive at any understanding of the belief of the majority.

Mr. Simons said that the tariff resolution, which was introduced, was objected to by him in the form in which it was first presented. It was amended in some particulars and when introduced the second time it was passed by a unanimous vote.

Robert C. Blood, chairman of the Cost Committee, announced that it was impossible for a committee of manufacturers, connected with the association, to arrive at a satisfactory report on this subject, and the committee advised the employment of an expert accountant for this purpose, or else referring the matter to the Board of Directors. Upon motion, the matter was referred to the Resolutions Committee for action.

The Treasurer's report was read and approved.

D. E. Douty, manager of the U. S. Conditioning and Testing Co., New York City, presented an address on "Some Causes Which Influence Cost in Knit Goods Manufacture." Mr. Douty read a paper before the American Cotton Manufacturers' Association in Washington last month, dwelling on some of the same topics, which was published in our report of that convention in our April issue.

The next paper presented was one by H. F. Hofer, which follows:

PRACTICAL METHODS FOR THE MANUFACTURE OF SILK KNITTED GOODS

BY H. F. HOFER

In my last years' address under the title of "Basic Quality of Silk and its True Value," I have endeavored to explain by what means these various points of quality should or could be ascertained and it will therefore not be necessary to repeat what was said then. All the more so since I take it for granted that Mr. Douty, the new manager of the U. S. Conditioning & Testing Co. will make these matters the issue or a part of the issue of his address which we are going to be beneficiaries of at this meeting of the convention. All that I might add in this direction is that there are still a number of silk consumers under the wrong impression the conditioning house to be an institution to determine the value of silk submitted for examination. The conditioning house only purports to establish facts, the interested parties having to derive their own conclusions from the facts or figures given by the conditioning house.

To know the actual condition of silk is for two reasons. The first reason is to know the true condition of the silk in order to be posted where or for what purpose best to apply such silk, the other reason is to ascertain those facts necessary to enable the proper checking up of the bill for value received.

Whenever the tests are made for the latter purpose, it is self evident that an understanding with regard to the expected value or quality must be underlying the transaction. With the arriving at standards along the lines as referred to in my last year's address and which are having due attention in official quarters at this time. Standards must and will come and will prove a blessing in more than one direction. There will be direct benefit derived from the establishing of the standards, but the indirect benefits will even be greater.

In order to substantiate this my belief, I will begin by saying that, according to my opinion, there are today altogether too many different grades on the market, the number of which will probably be decreased with the establishing of standards.

We know this origin of silk under at least ten different grades, from so-called Grand Double Extra down to the grade of so-called No. 1 1/2. For simplicity sake we might call these different qualities by the number, from No. 1 up to 10, with the assumption No. 10 to be the best, No. 1 to be the lowest. From the standpoint of basic stock, that means the quality of the cocoons, I believe it would be hard to distinguish more than say four different grades and therefore all the other grades are a consequence of workmanship. We may have little control over the basic quality of the stock and therefore we are bound to recognize the various qualities of basic stock as a necessity. What workmanship is concerned however there is no doubt that if the control at our disposition was exercised properly we could do away with all those grades which are created as a consequence of workmanship.

Two filatures may use cocoons of identical quality with regard to the basic stock. The one might spend say 20 cents more for workmanship per pound than the other and thereby produce a different silk from that of the other. The one silk might come to this market as grade No. 10, whereas the other might have to be sold as grade No. 7. Perhaps the mill or filature turning out the product of grade 10 is of more modern equipment than the other, or has at its disposition a better

trained force of help, being thereby enabled to turn out a better product than the other, but in most instances there is a different reason responsible for the different grade.

For the hosiery and underwear manufacturer, evenness of the thread is first and last consideration, and while elasticity and strength for all those purposes where the silk is to be tin weighted is a desirable asset, still the lack in efficiency in these respects is not as disappointing as the lack of efficiency in evenness.

Unevenness of silk is depreciating the value more than any other imperfection from a general standpoint, because it is detrimental in two different directions. First, off this imperfection (unevenness) when entering the goods, is depreciating the value of the goods on account of the poor appearance of the goods. This we may term indirect waste. But unevenness of the thread is also responsible for most of the direct waste made in all the various operations of manufacturing, especially in the throwing.

The greatest part of all the raw silk used in the knitting business is silk of the size of 13-15 deniers, with an average of 14 deniers. If that silk was of so even construction that the thread would at no place be finer nor coarser than 14 deniers, the waste in the throwing would probably amount to about one-tenth part of what it actually amounts to. Such waste would then be made up of but those short clippings after the making of a knot wherever it would become necessary to tie the thread of one skein or spool on to the other, since there would naturally be no breaks of the threads anywhere. But, unfortunately, silk is not of such even construction. On the contrary, such silk of average 14 deniers may in certain places be as heavy as 20 deniers and as fine as 10 or even 8 deniers. Those fine ends become so fine at places that the thin threads cannot hold the weight of the skeins and swifts or the spools and therefore break. Wherever such a break occurs it will be necessary to remove all those fine portions which at times may amount to hundreds of yards. The more uneven the silk is the more often do these breaks occur, and the waste originating from this source may amount to one, two, three and even more per cent., whereas the unavoidable waste or legitimate waste might not have amounted to more than a small fraction of one per cent. Taking into consideration that the waste caused by the unevenness of the thread naturally consists of but the finest part of the silk in question, we will at once

THE EXHIBIT OF THE HEMPHILL MFG. CO.

understand that if the waste in weight should have proved to be, say 3 per cent., the waste in length would naturally be more than that. If the average of the size, as said before, was 14 deniers and the 3 per cent. of waste in weight was composed on an average of 10 deniers, then we would come to the conclusion that while the waste in weight was 3 per cent., the waste in length was considerably more. One hundred pounds of 14 deniers equals 32,000,000 yards. Three pounds of waste of 10 deniers equals 1,369,500 yards, being 4.28 per cent. waste in length.

Inasmuch as the manufacturer is in the first place manufacturing with length and not with weight, he is naturally more interested in length than in weight.

The knit goods manufacturer, therefore, has a particular interest in the possible improvement of the silk with regard to its evenness, and it is an easy matter for him to contribute toward bringing this about. He must discriminate. He must look for the best silk in this particular direction. He must make it a part of his contract to stipulate what he considers as acceptable silk for this purpose. He must be guided by a standard. By this

he is doing away with all speculation or gambling with regard to the quality. He will necessarily recognize the advantages of high-grade silks. He will be ready to pay the full price for high-grade silk. He will not deceive himself. He will know he is economizing by doing away with that unnecessary or invisible waste. When paying the price for a high-grade silk and refusing to accept any substitution at a lower figure he will naturally create an interest on the part of the producer to produce the best possible silk at an equitable remuneration, contrary to his present interest in producing a low-grade silk at a falsely attractive figure.

The establishment of standards will reduce the number of qualities or grades. Every reduction in the number of grades will mean an increase in the efficiency of output and returns.

We may not so much be harmed directly by following the course of least resistance as producers, but we should absolutely refuse to adhere to this doctrine as consumers.

S. H. Weinhenmayer, of the Blue Ridge Knitting Mills, spoke on the subject of the "Minimum Wage and Eight Hour Law."

George S. McIntosh, secretary of the National One Cent Letter Postage Association, delivered a short talk along the usual lines of argument presented by this association.

The nominating committee recommended the following list of officers, who were unanimously elected. This is the same board of officers as last year, except that Eugene West takes the place of W. C. Plunkett.

President: Charles E. Leippe, Reading Knitting Mills, Reading, Pa.

EXHIBIT OF E. O. SPINDLER

First Vice-President: Edward Blood, Sr., John Blood & Bro., Philadelphia, Pa.

Second Vice-President: T. H. Johnston, Knoxville Knitting Mills Co., Knoxville, Tenn.

Secretary: C. B. Carter, 314-316 Drexel Bldg., Philadelphia, Pa.

Treasurer: Robert C. Blood, John Blood & Co., Philadelphia, Pa.

Advisory Board: Harold Lamb, Union Mfg. Co., Union Point, Ga.; F. L. Chipman, Chipman Knitting Mills, New York City; Fred W. Simons, Simons & Struve Hosiery Co., Frankford, Philadelphia; Jos. S. Rambo, Rambo & Regar, Norristown, Pa.; Garnett Andrews, Richmond Hosiery Mills, Chattanooga, Tenn.

Board of Directors: Joseph Feldenheimer, Roxford Knitting Co., Philadelphia, Pa.; W. Park Moore, Brown Knitting Co., Philadelphia, Pa.; Wm. E. Hall, Shaw Stocking Co., Lowell, Mass.;

Eugene West, West Bros., Syracuse, N. Y., S. D. Bausher, Gotham Underwear Mills and Bleach Works, Hamburg, Pa.; D. L. Galbraith, World's Star Knitting Co., Bay City, Mich.

The committee on resolutions presented the following, which were unanimously adopted.

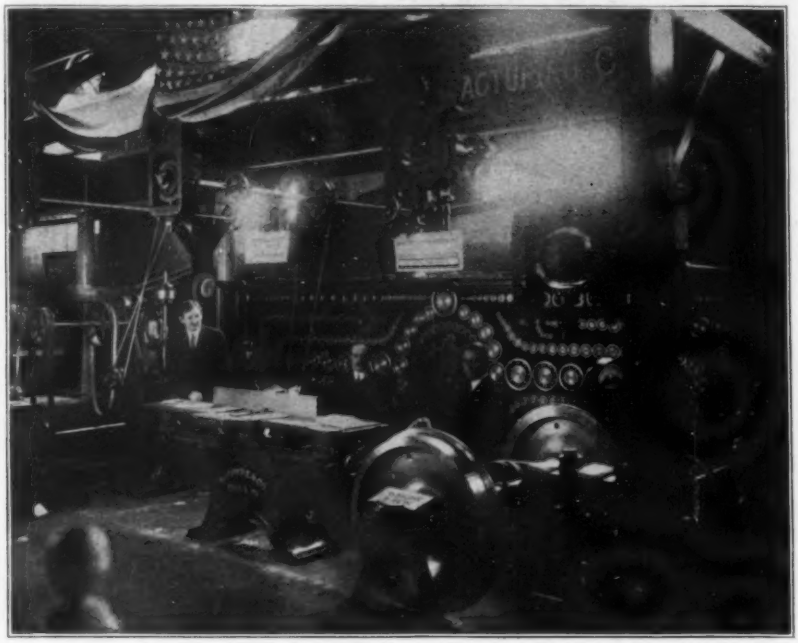
RESOLUTIONS

The Ways and Means Committee has framed a measure known as the Underwood Bill in which hosiery and underwear have been placed under a duty far below the Dingley rates. The Dingley rates on cotton hosiery were deemed insufficient, and were supplanted by the rates in the Payne-Aldrich Bill. The Payne rates on hosiery were the result of careful analysis of the comparative costs of production here and abroad, and were in accordance with the plank in the Republican Tariff Platform which declared for that measure of protection which offset the difference in such costs. The Underwood Bill makes a cut of over 40 per cent. in cotton hosiery, and of 40 per cent. up in underwear, and a reduction in woolen hosiery and underwear even more drastic, and must result in the ruin of our respective industries, reduction of wages and general distress.

The savings in the cost of raw wool and in cotton yarn does not compensate for such drastic reduction.

Whereas we believe that the enactment of this bill in its present shape would be disastrous to our industries and bring distress to those employed by us, be it resolved, that we respectfully and earnestly protest against the passage of this bill in its present shape, and ask that the Payne rates be maintained.

Be it further resolved that copies of this protest be sent to each member of the Committee on Ways and Means of the House of Representatives, to the Finance Committee of the Senate, to every member of the House of Representatives, of Congress, and to each Senator, and also to the President of the United States.



THE HESS-BRIGHT MFG. CO.

Resolutions were also passed favoring one cent rate for letter postage.

MANUFACTURING COSTS

Whereas, the question of costs for the manufacturer and distribution of knitted goods continue to be a matter of more or less uncertainty and in consequence of which much demoralization is caused by goods being placed upon the market at prices based upon erroneous costs always under rather than above, to the serious disadvantage of those manufacturers who have adopted effective and practical cost systems.

Therefore, be it resolved that the National Association of Hosiery and Underwear Manufacturers in Convention assembled instruct its officers and Board of Directors to give this matter very careful consideration at as early a date as possible, in an effort to adopt some definite plan of accom-

plishing the results desired, and that they be empowered to play same in operation if in their judgment when a satisfactory plan is consumated.

CREDIT BUREAU DEPARTMENT

Whereas, the continued operation of the Credit Bureau Department of the National Association of Hosiery and Underwear Manufacturers has more fully demonstrated the efficiency of this system for the mutual protection and advantage of the members of our Association, be it

Resolved, that we commend very highly the methods pursued in securing the results that have been achieved, and that the Secretary be instructed to make every possible effort to enlist the cooperation and support, not only of all members who have not joined in this work, but also endeavor to secure the memberships of all Knitting Manufacturers not now members of the Association.

BANDS, LABELS AND SPECIAL PACKING

Whereas, the abuses imposed upon the knitting manufacturers in supplying the buyers' requirements as to bands, labels and other special packing—incurring much annoyance and delay, as well as excessive cost—has shown no appreciable abatement during the past year, and

Whereas, this question has been under consideration during the past year and attentive plan has been suggested whereby this question may be solved to the advantage of both manufacturer and buyer,

Therefore, be it resolved, that the National Association of Hosiery and Underwear Manufacturers in Convention assembled instruct its Board of Directors to give this matter their mature consideration during the ensuing year and put the plan into operation when conditions justify such action.

NET WEIGHT YARNS

Whereas many of our members have found the purchase of cotton yarns upon the net weight basis of greater advantage than the old method of buying upon the 2 per cent. tare basis, and the number of knitting manufacturers who demand and receive net weight terms is constantly increasing, therefore, be it

Resolved that the National Association of Hosiery and Underwear Manufacturers in convention assembled impress upon all members who are not now buying yarns on the net weight basis to adopt this plan, and as a means of impressing upon them the importance of these terms, we recommend that they adopt the system prepared by the Association of keeping accurate yarn records. And be it further

Resolved that our members give preference at all times to the spinners and yarn houses who have adopted net weight terms.

SECRETARY'S REPORT

The association year that is now drawing to a close has been an unusually busy and active one, and we hope that the results of our work have been fully appreciated by our members, and that the ultimate results of our efforts will have a far-reaching effect in the future. We, of course, have not accomplished everything that has come up for consideration, nor have we been enabled to mature our plans for new lines of work proposed, which eventually must result to the advantage and pecuniary interest of every knitting manufacturer in the country, but we know we have made progress, which is clearly demonstrated in this annual convention and exhibition. The short time at our disposal for the sessions, and the immense amount of work that must be transacted in this period, will prevent our going into details in reporting the year's work, but we will give you brief reports on some of the more important questions that have been under consideration.

Perhaps the most vital feature in the history of any organization and in its activity is that of its membership. So long as an organization shows a steady increase in membership—which can only be secured by work, well planned and performed—progress is evident. No association can continue to grow unless there is a sufficient substantial basis for retaining old members and in securing new ones. We feel we have been very successful this year in this direction, having obtained 42 active members, 18 associate members and, best of all, 10 old members, who have in the past resigned their membership, have made application for reinstatement and, of course, were accepted.

NET WEIGHT YARN MOVEMENT

Our annual convention would be incomplete without reference being made to the net weight yarn movement, which was inaugurated by our association about six years ago. Those of our members who have carefully investigated this department of their business, of course, fully recognize the importance of this method of purchasing yarns, and they have been successful in securing net weight terms, but for the benefit of many of our members who have apparently not fully considered this imortant question, we would urge that they immediately take steps to thoroughly investigate this matter. But for the luke-warm support we have received from many of the knitting manufacturers, the net weight yarn proposition would have been generally adopted by all spinners and yarn houses. The knitting manufacturers have been the sufferers through such tardy cooperation, and it is to those we urge investigation. While it is true an advance price is usually asked on net weight terms, yet even on this basis there is a distinct advantage in buying yarns upon the net weight basis. Plans are now on foot that would indicate a speedy solution of this question, and that, too, to the advantage of the knitting manufacturer, particulars of which at this time are not ready to be announced. It is generally conceded by the knitting manufacturers and acknowledged by the yarn people that our agitation on this question has proved productive of most excellent results, as the tare now averages from 3 to 4 per cent., while previously in many instances investigation proved that from 9 to 10 per cent. tare was a common occurrence. There should be no argument in objection to net weight terms, and we are unable to understand why the yarn people should persist in adhering to old, obsolete methods of doing business. The knitting manufacturer must deliver every dozen goods as billed, and there is no reason why he should not obtain every pound of yarn for which

he pays. This subject will come up for special consideration at a later session, and we hope that strong and effective resolutions may be adopted that will lead to a more effective enforcement of net weight terms.

CREDIT BUREAU DEPARTMENT

We are happy to report substantial progress in further developing the association's credit bureau department. Many members who in the past have not contributed their cooperation and support to this line of our work have taken up same during the past year—their delay in doing so being caused possibly by a misunderstanding of the scope of the facturers as themselves. The financial ratings of the buyers are not so prominent a feature through our reporting system as is their methods of doing business, trade abuses and other lax business practices. We still realize, however, that there is a difference of opinion among the knitting manufacturers as to their ideas of a buyer's standing, and it will always be so, but in the general run the experience supplied by our members is correct and clearly indicates the standing of the buyer in question.

COLLECTION DEPARTMENT

The collection department, which is being

THE WILDMAN MFG. CO.

work. Many of the new members we have secured during the past year have come in largely to enjoy the advantages from this department, and they are realizing substantial results from same. As it is generally conceded by both buyer and seller, credit is too cheap. The incentive to sell goods, particularly when orders are scarce, leads many manufacturers to take chances where the odds are greatly at a disadvantage as to prompt settlement, or, in fact, any settlement at all. Mercantile reports often influence such courses. Our association's credit bureau department has enabled our members to avoid assuming risks that possibly they would have incurred by depending on other sources of information.

We now have nearly three-hundred manufacturers and selling agents contributing their experience through this department, and the number is constantly increasing. We are now in position to give our members a wide range of trade experience, and that, too, from the same class of manu-

operated so successfully by our organization, and has now been in force for the past eight years, continues to give satisfactory results, and we are glad to be able to report that a larger number of our members are using same more than ever before. This department is operated free to the members, and they are put to no expense on collections made through this channel, in which event the only expense incurred therewith would be the actual charges made by them.

SUB-ASSOCIATION WORK

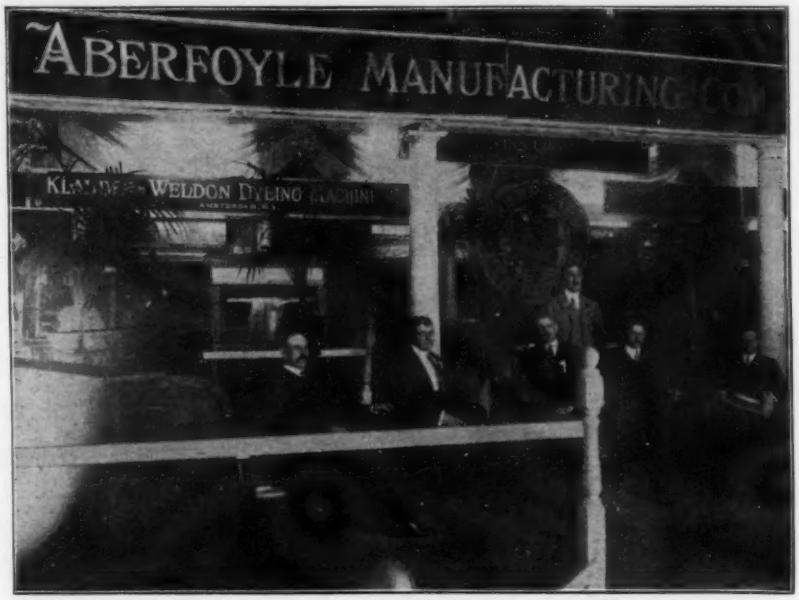
Progress in sub-association work has also been made during the past year, particularly with the underwear members of our association, the Pennsylvania manufacturers particularly having been active in this direction. Meetings have been held at Reading every 60 days and have been successful, as will be attested by those who have been present from time to time. We hope to more fully organize the underwear manufacturers from other

sections and perfect sub-associations for their benefit.

Soon after our last annual convention active steps were taken to organize the knitted necktie manufacturers. Substantial progress was made in the beginning; but the condition of the necktie market has become so demoralized that it has been difficult to maintain this branch. Many of the manufacturers cooperating in this sub-association were of the impression that prices and terms could be fixed and maintained. This, of course, was contrary to the association's rules and regulations, and at the same time illegal, and we attribute the slow progress in organizing this branch to this fact. We still have hopes that other lines of work and we want to have your suggestions the coming year as to subject matters that may be embraced in the next issue that will make this publication one most eagerly sought after.

EXHIBITION

Our exhibition this year needs no special introduction. The demand for space from exhibitors this year has far exceeded the capacity of the first regiment armory. When we look back eight years ago to the first exhibition we held at Eighth and Chestnut Sts., we have just cause for congratulation, not only to the exhibitors who have supported the movement from year to year, but also to the knitting manufacturers who have so largely



THE ABERFOYLE MFG. CO.

of perhaps equal importance may be decided upon that will enable us to more fully develop this branch of our industry.

No movement of special importance has been undertaken during the past year to develop the hosiery sub-association, but plans are in process for organizing sub-associations among the sweater manufacturers, glove and mitten manufacturers and the fancy knit goods manufacturers.

OFFICIAL PROGRAM

In view of the success that has followed our efforts in the preparation of the official programs from year to year, even enlarging its possibilities, we now refer to same as our annual program and year book. We feel quite sure you will find this year's book one of usefulness all the year round, as we have incorporated in same many new features that should make it a ready reference book, attended same and utilized its functions in quickly deciding the relative value of equipment and supplies. These exhibitions have not only enabled the association to arouse enthusiasm in our annual conventions, and thus induce a large attendance, but has also afforded the association added revenue that has enabled us to more fully develop our association than otherwise would have been possible.

In conclusion, your secretary wishes to express his sincere thanks to your president, the officers and the individual members for the many courtesies extended and the assistance rendered. He has by no means grown weary of the work entrusted to his care from year to year, and is anxious to continue to serve you in the future, not more diligently than in the past, but in perhaps a more intelligent manner, as is natural from the vast experience and wide training he has had in

THE UNIVERSAL WINDING CO.

THE FRANKLIN PROCESS CO

previous years. In the same manner we look backward and compare our present accomplishments with the small membership and meager results obtained one, two or three years ago, we shall grow and achieve results that even in a year hence we may look with indulgence back to the work of this convention in which we now take so much pride. C. B. Carter, Secretary.

Philadelphia favored the convention with a perfect brand of weather, which gave the visitors every opportunity to enjoy the meeting to the utmost.

The attractive badges facilitated acquaintance. Each visitor, who had signified his intention of being present, and all members, had given to them a badge on which appeared his name and business connection. This feature was favorably commented upon as tending to promote acquaintance and business.

The smoker and vaudeville entertainment on Wednesday evening brought five or six hundred manufacturers, exhibitors and guests together in the hall of the Scottish Rite Bldg. This entertainment with refreshments and the stage performance, was tendered with the compliments of the association to the visitors and guests who had helped to make the exhibition such a success. The hall was taxed to its capacity by a good-humored audience, which came prepared to be pleasantly entertained and was not disappointed. This is one of the social features of the convention which has come to be a fixture and affords a pleasant opportunity to get together in an informal way.

As there was no hotel designated as official headquarters, the visitors were scattered in different places, but the exhibition hall was of course the center of attraction, and as the exhibition was open in the evening until ten o'clock, that occupied the attention of the visitors.

THE PHILADELPHIA DRYING MACHINERY CO.

The special restaurant, which was installed in one of the rooms of the building, proved of much convenience to the exhibitors and the delegates and was well patronized.

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The total number of cotton spindles in the world is estimated at 131,503,062, of which there are 53,311,630 in Great Britain, 10,162,908 in Germany and 27,783,000 in the United States.

For the seven months ending January, 1912, the exports of cotton cloth from the United States amounted to 253,000,000 square yards, as compared with 186,000,000 square yards for the same period of 1911, and 188,000,000 square yards for the same period in 1910.

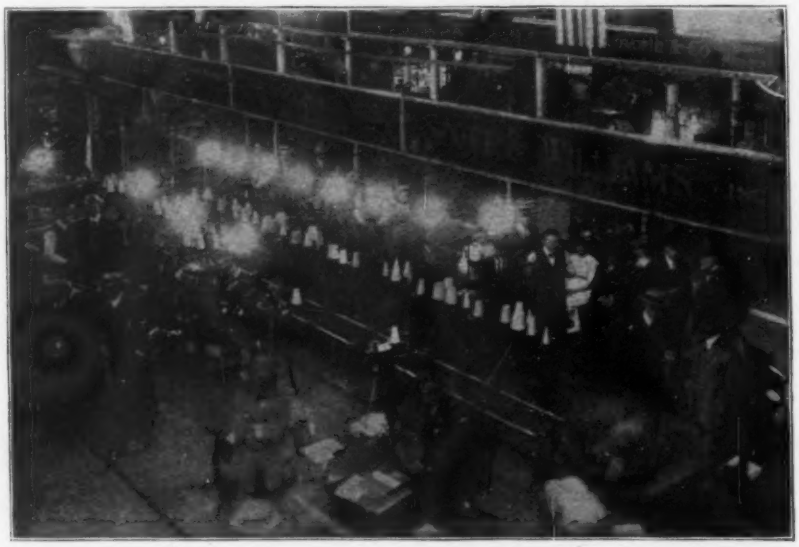
The Philadelphia Knitting Machinery Exhibition

The success of last year's exhibition demonstrated to intending exhibitors that early application for space was desirable, with the result that several weeks before this year's exhibition opened every available foot oi space had been taken up and a considerable number were disappointed in securing room.

The suggestions made by a number of the exhibitors as a result of last year's show, were carried out by the management with excellent results. When the doors opened on Monday morning, May 5th, the exhibition was very nearly in complete running order and by Monday evening was practically complete.

The decorations followed the scheme of last year and were most attractive. Green and gold were the basic colors on the wall while flags and bunting adorned the galleries and ceilings. The exhibitors' signs were in green and gold of a uniform pattern, which added to the scheme of decoration. Neat white railings, rugs and uniform office furniture in the booths gave a finish to the hall. A band of music added to the evening's attraction. The lighting in the evening was much better.

The attendance on the first day or two was rather light, but by Wednesday the manufacturers and visitors were present in throngs and at times the aisles were uncomfortably crowded. Many novelties in the line of machinery were shown for the first time. The exhibitors almost without exception reported themselves well satisfied with results from a business point of view. A good many orders were placed and many new prospects developed.



SCOTT & WILLIAMS, INC.

To describe in full detail all the exhibits would far exceed the limits of this issue, but we present and illustrate the principal features of the different exhibits in this attractive show. It is extremely difficult for photographs to do justice to the exhibits. They must be taken by flashlight and oftentimes under such disadvantages that good results are almost impossible, but taken together, they give a very good idea of the extent and general character of the exhibition, which each year gains in interest and is visited by

a large number of manufacturers from all parts of the country as well as those from other countries. One of the largest manufacturers of knit goods in England has not failed to visit this exhibition every year for the purpose of familiarizing himself with the latest improvements in the United States.

Scott & Williams, 88 Pearl St., Boston, Mass., showed their samples of standard shirt and hosiery machines, including both seamless and ribbed, also their new system of seamless hosiery machines, which was described in our April issue. The exhibit included a new type of fine gauge underwear machine similar to, but an improvement on the fine gauge shirt machine exhibited last year. They also showed one of their new single head band machines, similar to a single head of the multiple head band machine exhibited a year ago.

JENCKES KNITTING MACHINE CO.

The Jenckes Knitting Machine Co. of Pawtucket, R. I., exhibited in operation a line of full automatic seamless hosiery knitting machines, with attachments for various kinds of work, conforming with the modern demands of knitters. An opportunity was offered to inspect the careful design and workmanship of their latest machines, and to observe the results of this care in producing the quality of fabric associated with the Invincible machine. There was a corps of experts and representatives in attendance for the purpose of assisting visitors in obtaining information or demonstrations they may desire in connection with the manufacture of seamless hosiery. Especial attention was given to those unfamiliar with the hosiery business who were thinking of going into the business.

The Philadelphia Drying Machinery Company exhibited in operation their latest improved machinery for dyeing, drying, singeing and finishing hosiery. Every opportunity was afforded manufacturers to acquaint themselves with the latest improvements that have been embodied during the past year. The Philadelphia Drying Machinery Company have made a specialty of these important branches of the knit goods business, and had in attendance a number of their practical men who demonstrated the machines. For dyeing hosiery, the "Hurricane" circulating dyeing machines are of particular interest, as they have been very generally adopted by the largest manufacturing concerns throughout this country and abroad for dyeing developed black, sulphur black, and colors for either silk, mercerized or cotton goods. By making it possible to obtain first-class dyeing with a cheap class of help, these machines have gone a long ways towards solving the labor problem in the dye house. Drying machines of fire-proof, steel construction have been perfected during the past year. The double-thick steel panels, with air-cell asbestos between the two layers of steel make an excellent insulator, retaining the heat within the machine and greatly increasing the output of the dryers. The "Hurricane" automatic singeing machines of the Hagar type embody several improvements over those which were exhibited last year. As the inventors and original builders of this type of machine have had exceptional opportunity of watching its development among the many mills that have adopted it, they are prepared to show that the cost of singeing has been reduced

until it is now but one-half of the former expense. Hydraulic presses are furnished in various sizes, with or without hot and cold plates. Several styles of power screw presses were also shown. For some goods, pressures of 50 to 100 tons are sufficient, but for woolen goods and dress goods generally, presses capable of exerting from 300 to 500 tons' pressure are supplied. Fans and ventilating and heating apparatus were shown in operation, together with a comprehensive exhibit of photographs, showing many of the installations made by The Philadelphia Drying Machinery Company.

PAXTON & O'NEILL.

Paxton & O'Neill, 537-41 N. 3rd St., Philadelphia, exhibited their full automatic yarn changer knitting machines making silk and plated hose and half hose. These machines show the latest improvements in mechanism for making these goods in the finest gauges, for which the company is specially noted. They were noticeable not only for the fineness of the fabric made on latch needle machines, but for smoothness of operation and accessibility of the parts for adjustment. Mr. Jackson, their sales manager who is so well known to the knitting trade, was in charge of the exhibit.

The Hess-Bright Manufacturing Company, Philadelphia. A large illuminated case at the rear of the exhibit showed the different types of ball-bearings which are manufactured by the company. There were five lines of shafting from 1 15/16 to 2 15/16 inches in diameter, running 450 revolutions a minute, and a pair of 36-inch trolley car wheels mounted on ball bearings running 225 revolutions per minute. A smaller exhibit showed the difference between the ball and ring oiling hangers where a load of 1,600 pounds is held suspended from four belts so that the plain and the ball bearing are uniformly loaded. This exhibit is run with a 1/4 h. p. motor, and shows the difference in friction of 100 watts.—The starting load on the plain bearing is so great that it is impossible for the 1/4 h. p. motor to start the plain bearing side without assistance from one of the men around the exhibit. The ball bearing side can be readily started with the 1/4 h. p. motor, and the starting load is only slightly higher than the running load. A. A. MacCallum, head of the textile department, J. S. kunkle, head of the hanger department, and A. B. Vieth, supervisor millwright, were in attendance.

E. O. Spindler, 356 Broadway, New York, N. Y., agent for Edward Dubied & Company, Couvet, Switzerland, builders of flat knitting machines, had an extensive exhibition of different kinds of knitting machines. He occupied the same booths as last year. The exhibit consisted of various types of shaker sweater machines, now so much in demand. Another very interesting feature for underwear manufacturers was a new type of machine for knitting crocheted trimmings for underwear fronts. A further interesting exhibit was an accordion necktie machine for knitting bias striped accordion neckties. There were several practical demonstrators in attendance, the exhibit being in charge of E. O. Spindler, and all were kept busy by the many visitors interested in sweater, underwear, necktie and full fashioned hosiery machines.

HEPWORTH & CO.

John W. Hepworth & Co., manufacturers of looper cutters, N. W. corner Lehigh Ave. and Mascher St., Philadelphia, exhibited two of their new model elastic stitch loopers and one looper of the old model with the two thread attachment. These machines were all equipped with the new Hepworth cutter.

George C. Decker, 17 S. 3rd St., Philadelphia, exhibited various types of stencil making machines, both flat and round machines, including a line of supplies for the shipping departments of manufacturing concerns together with stencil filing cabinets.

Max Nydegger, agent for the Grosser Knitting Machine Co., 260 W. Broadway, New York, exhibited a looping machine and single bed shaker machine, making the garment in one piece. This machine is operated at a high speed, requiring over 18 feet of yarn per second. All the shaping of the article is done by fashioning, not one ounce of the material wasted per dozen. The welt is turned on the machine, illuminating thereby all hard finishing except shoulder looping, borders, collar and other trimmings as well as sleeves, fastened on selvages.

The Franklin Process Company, yarn dyers and builders of dyeing machinery, exhibited one of their one thousand pound Franklin process dyeing machines. The company furnished machines with a capacity of from 25 to 1,000 pounds to a batch, the machine occupying one-fourth of the floor space required for older methods. They also showed samples of yarns dyed by them and put up in the various packages required by their customers.

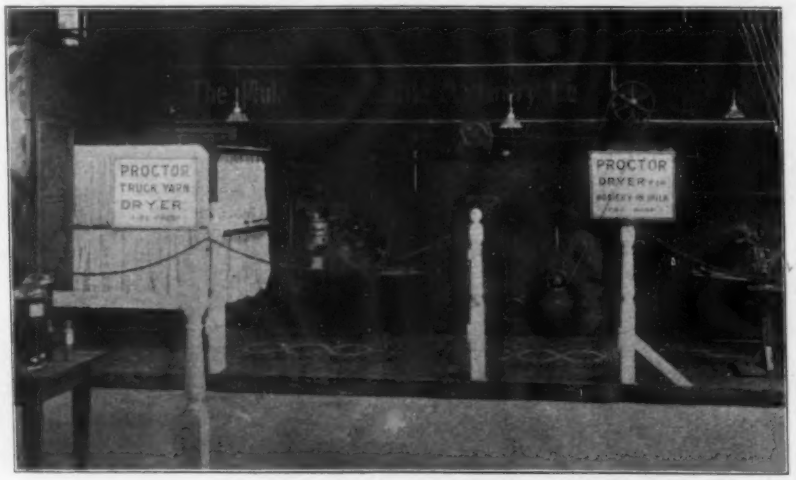
GROSSER KNITTING MACHINE CO.

The Universal Winding Company, Boston, have found that the market demand for reinforced soles of socks makes it desirable that means for carrying a larger package of splicing yarn should be applied to knitting machines. The small cone of fine yarn produced on the Universal coning machine, meets the requirements fully, as it holds the largest possible amount of yarn in a small compass. A machine with this equipment was shown in operation. The Universal Winding Company also showed one of their regular No. 90 quilling machines, with an attachment wound on a bottle-shaped bobbin which will hold nearly one-half pound. This furnishes a fine supply of full-fashioned knitting machines, as the delivery of yarn is as nearly perfect as possible. The machines were shown in operation, winding yarn as

The Hemphill Mfg. Co., Pawtucket, R. I., exhibited four of their latest improved machines. They called special attention to their new model split-foot machine, which they are now ready to take orders on. This new split-foot machine was 220-needle, 3 3/4-inch diameter, fitted to make either half-hose or ladies' stockings. They also had a 220 3 1/2-inch diameter, fitted to make plaited work, with the crow-foot attachment, one 220-needle, 3 3/4-inch of their regular combination type to make ladies' silk boot work, and a 200-needle 3 3/4-inch to make general half-hose with a heavy heel and toe.

The Wildman Mfg. Co., Norristown, Pa., had an exceptionally complete exhibit, which included the following machines: Swiss rib body machine, 17 inch diameter, 12 cut, 36 gauge, 12 feeds. This is the new machine with revolving cams, instead of revolving cylinder and dial. It is a departure from the usual machine of this type in that it has a dogless attachment,—one of which has found so much favor in the Wildman ribbers. In addition, this machine has a new friction drive, possessing the usual advantages of such drives, namely, compactness and quick stopping without the disadvantages of too sudden starting and resistance to hand turning. This drive may be operated from the back of the machine, as well as the front, and is self locking in the stopped position, so that there is no possibility of the machine starting of its own accord. Another novel feature is the horizontal yarn carrier and latch guard. This carries the yarn to the needles more directly than is customary, affords a clear view of the cylinder needles, draws the yarn well in under the hooks and has a porcelain eye which is adjustable independently of the latch guard. A plain body machine of the usual Wildman type, with comparatively new positive and gravity take-up. This machine is 15 inch diameter, 16 cut, 36 gauge, 8 feed. French welt ribber, 3 1/2 inch, 110-110 needles, 36-48 gauge, 2 feeds, Wildman ribber stop motion. A striper is adjusted to this machine for use either for making ornamental stripes or for inserting a clearing thread sufficiently strong to draw without breaking, thus enabling the use of soft yarn for the cuff without the disadvantage of draw threads which fail to draw readily. An accordion rib necktie machine, 2 3/4 inch, 60-60 needles, 36-48 gauge. 2 feed. In addition to the dogless attachment, long range chainless pattern mechanism and two stripers, this machine has two trick wheels for diagonal effects as well as vertical ones. The ballard cloth cutters, both circular and vertical knife patterns, were included in the exhibit. Those in attendance were kept busy explaining the merits of the machines to interested visitors.

The Philadelphia Textile Machinery Company had an interesting exhibit of the most improved drying machinery. The exhibit consisted of a Proctor tin proof stocking dryer for stockings on boards, a dryer for hosiery in bulk and a truck yarn dryer. These dryers contain a great many improvements which cut down the cost of operation and upkeep of the drying machinery. William Bald, Wm. H. Rihl, E. Bayres and F. Kershaw were in attendance.

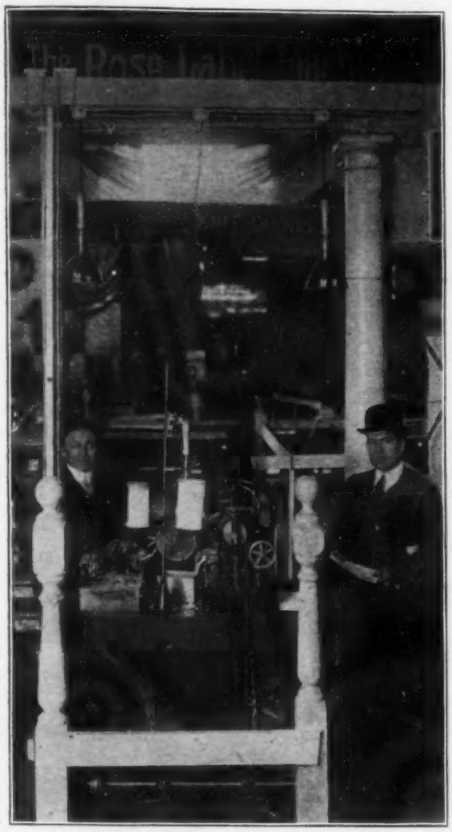


PHILADELPHIA TEXTILE MACHINERY CO.

The Barrett Adding Machine Co., 506 Bulletin Bldg., Philadelphia, exhibited one style of their portable adding and computing machine and distributed a folder, showing how it was being profitably employed in connection with work in the textile mills. The portable machine overcomes the objections that have been offered to the heavier types. The operation of this machine appears to be so simple as to require a very short time to become accustomed to it. The Barrett organization has studied the requirements of the different branches of industry and has prepared literature covering the different problems.

The Metropolitan Sewing Machine Co., Nyack, N. Y., through their Philadelphia office, with W. O'Donnell, district manager in charge, exhibited twenty different machines adapted to the knitting line. Some of these were entirely new to the trade. They included an improved figure 8 machine for French neck on women's underwear, a new style facing machine No. 90-4, also a new style stay and draw band machine No. 90-2. A star feature of their exhibit which aroused much interest was their new taper collaret machine which tapers a collar automatically.

The Rose Label Machine Co., manufacturers of automatic label stitching machines and automatic label cutting and folding machines at Grand Rapids, Mich., had on exhibition an automatic stitching machine with certain other moving parts en-



ROSE LABEL MACHINE CO.

closed in a glass cover. Visitors were thus able to inspect the mechanism and study the principles on which it operates. This machine has an automatic thread trimmer and label placer and was run by a girl operator from a factory where they are using the machines. The exhibit included a cutting and folding machine embodying all the latest features. Mr. Rosenthal and Mr. Bulkeley were in attendance at the exhibit.

The Cassella Color Company, New York and Philadelphia, exhibited several qualities of cotton hosiery dyed with the well-known "Diamine Colors," including their new developed black, "Diamine Neron" and "Thio Carbon N. N. G." the most soluble and level working sulphur black. They also exhibited silk and cotton stockings in various shades dyed with the Diamine colors, which are particularly adapted for perfect work in this line of goods.

The latest improvements in cloth cutting machines were shown by the Eastman Cloth Cutting Machine Company, Buffalo, N. Y. During the past year some important improvements have been embodied in their machines, securing not only greater speed, but greater durability and convenience in operation. For safety their improved presser foot, both on the reciprocating and rotary machines, makes it almost impossible for an operator to cut his fingers against the knife. This is important in view of the new employers' liability laws in force in many States. A patent adjustment on the rotary machine enables the operator to lower the knife into the plate as the blade wears away, thereby keeping the edge of the blade the same distance at all times from the edge of the plate. This also enables a blade to be used much longer than by the old method of increasing the height of the plate as the blade wears down. Many of the visitors to the booth availed themselves of the opportunity of taking away with them one of

EASTMAN MACHINE CO.

their handsome catalogues entitled. "A Few Cutting Remarks," which they no doubt found of value when considering the placing of an up-to-date cutter in their plant.

Charles Hammer, 260-265 West Broadway, New York City, sole American representative for the Boessneck full-fashioned knitting machine, had space in which he and Mr. Hermann entertained their friends. Mr. Hammer was unable to show a machine in operation, but gave a good description of the fabric made on his machines.

The Link Belt Co., Nicetown, Philadelphia and Chicago, showed a working model of the silent chain drive for power transmission. It is used by a number of knitting manufacturers for driving machines from electric motors. They report an increasing business with this branch of trade.

Smith, Drum & Co., Coral and Cumberland Sts., Philadelphia, exhibited their new dyeing machine which has been designed for dyeing the first grades of hosiery, the principal object being to get perfectly even dyeing in the light shades and most delicate work; also to overcome rough handling of silk goods. This new machine is illustrated and described in the New Machinery Department of this issue. They also showed several other types of machines in which were their hosiery singeing machine, hot and cold presses, electric bleacher and an automatic air compressor. Mr. Smith, Mr. Drum and Mr. Skitt were in attendance and gave their personal attention to those interested.

The Barber-Colman Company, Rockford, Ill., had an exhibition of their well known Barber knotter for winding and spooling. This machine is made in three sizes designated as A, B and C, and equipment can be furnished for a wide variety of cotton yarns, such as 140s single to three and four ply 6s; also for worsted and silk. Mechanically tied knots such as are made by this machine give less trouble in the subsequent processes through which the yarn passes than do knots tied by the average hand operator. Highly skilled operators are not required, as the Barber knotter, properly adjusted, does better work in the hands of a comparative beginner than can be turned off by hand

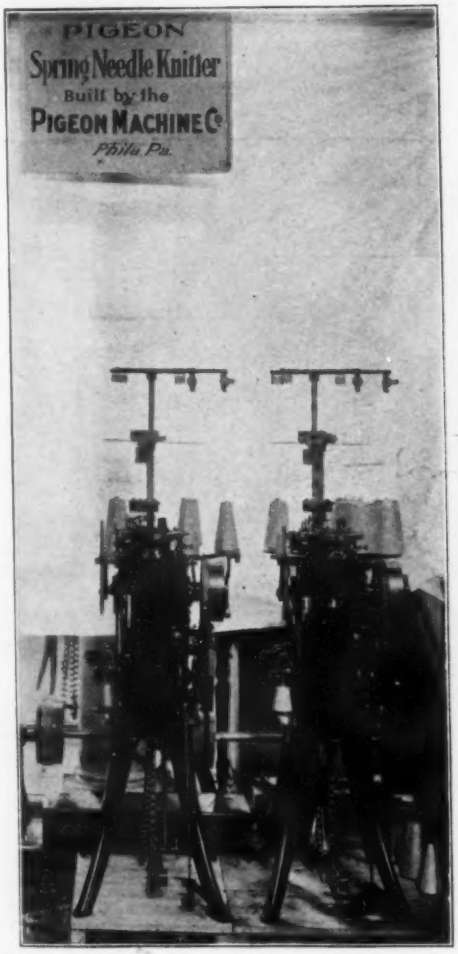
SMITH, DRUM & CO.

The Berlin Aniline Works, New York, displayed a full line of dyed hosiery in a great variety of styles, shades and qualities. The exhibitions of the Berlin Aniline Works at the Annual Conventions of the National Association of Hosiery and Underwear Manufacturers have always aroused a great deal of interest among manufacturers and dyers, and this year the interest was especially strong on account of the many suggestions offered to the careful observer. The principal colors used in the display are so well known to the trade that it will be unnecessary to go into further detail. We only wish to mention sulphur black and Zambesi black, representatives of two groups of colors that have established a reputation of their own. The former was shown on ordinary cotton goods, from the finest to the coarsest and the heaviest grades; the latter on mercerized cotton and on silk goods. A great variety of fancy shades on mercerized cotton and silk hosiery attracted much attention.

operators other than those of long experience and exceptional skill. Knots are tied by this machine much more quickly than by hand and no long ends are left to require attention. The manufacturers claim that the Barber knotter will increase production and improve quality, both to a considerable degree, and their claim is substantiated by actual results obtained in many mills. The exhibit was in charge of Mr. Goodrich and Mr. Anderson of the Boston office.

The Paramount Metal Forms Co., of Beaver Dam, Wis., who recently took over and equipped a large plant for the manufacture of "Ermentrouts" hollow metal hose forms, equipped a space at the exhibition with a desk and chairs in which W. D. Butz, Bourse Building, their selling agent, received their visitors and explained the various changes made by the new company in their appliance which they claim is now up to date in every particular.

One of the novelties of the exhibition which attracted much attention was the Pigeon spring needle knitting machine, exhibited for the first time by the Pigeon Machine Co., Jasper and Orlean Sts., Philadelphia. For the first few days of the convention only one machine was shown, with a 3 3/4-inch revolving cylinder, 220 needles. It was fitted with a five finger yarn changing device,



PIGEON MACHINE CO.

including high spliced and double sole. Later in the week a 288-needle machine was installed, doing equally good work. As evidence of the good construction of the machine, it was noted that within half an hour from the time this machine was taken from the truck into the exhibition hall, it was belted up and running satisfactorily. Mr. Pigeon, the inventor, was in attendance and demonstrated the operation of the machines to many interested manufacturers. One hundred of these machines have now been running in one mill for about a year and the manufacturers are contemplating further additions. We expect to publish a more detailed description in the next issue.

The Kaumagraph Co., 209 W. 38th St., New York, showed various lines of goods, which illustrated their improvements in many directions. The special feature of the occasion was a new machine for printing trademarks by the Kaumagraph method on hosiery and underwear. This is to be a very simple device to be sold at a moderate price within reach of any manufacturer. The machine is so constructed that it can be operated either electrically or by foot power and is, therefore, adapted for conditions in any part of the country. Manufacturers showed their appreciation of the combination of a Kaumagraph stamp which makes an impression without the use of water, which is absolutely dry the moment it is made, and free from possibility of blur or smut, and an automatic device for applying the stamp. This is just what manufacturers require.

C. E. HARDENBROOK CO AND ACME STAPLE CO

The Acme Staple Company, Camden, N. J., had on exhibition a machine for ticketing hosiery and other goods. They also showed a line of binders used for office filing, and a full line of binders used for ticketing and binding swatches for sample work. The exhibit included a laundry tagging machine, used in laundries for fastening tags on garments.

The American Laundry Machinery Co. had on exhibition their new automatic underwear press. E. F. Ainderhill, secretary of the company, assisted by W. W. Miller of New York City, were kept busy showing the advantages of both the automatic press and their extractor.

The Aberfoyle Manufacturing Co., Chester, Pa., through their Philadelphia office, 310 Lafayette Building, 5th and Chestnut Sts., occupying a large space extending from aisle to aisle, exhibited their various grades of mercerized and dyed yarns in skeins, cones, tubes and warps. The company was represented not only by C. L. Gilliland, W. T. Galey and Frank Galey, from the main plant in Chester, but also by its representatives located in various sections of the country as follows: T. J. Golden, Samuel Rowcroft and J. H. Thomas of Philadelphia, William Adams and James Holt of Chicago.

J. A. Firsching, manufacturer of textile machinery, corner John and Catharine Sts., Utica, N. Y., exhibited a "1912" cloth cutting, folding and winding machine, a "20th Century" cloth cutting, folding and winding machine, an electrically heated neck marking machine, a collarette cutting and winding machine, a cuff cutting machine, a "Frictionless" vertical drying machine, and button and button hole spacers and paraffine device.

The Karl Schlatter Dye Works, Inc., Ontario, Hartville and Rorer Sts., Philadelphia, exhibited various samples of dyed materials in the way of hosiery and cotton and mercerized yarns, wood silk, natural silk and cotton sized, art silk and cotton mixed hosiery. Also a line of fast colors and regular colors on cotton yarns. Benjamin Firth, their representative, had charge of the exhibit.

Scholler Brothers Company, 3301 Amber St., Philadelphia, exhibited their entire line of soaps, softeners and specialties for dyers, bleachers and finishers.

The Enterprise Mill Soap Works, Inc., 2229-31-33 N. 12th St., Philadelphia, had a very interesting display, showing a complete line of their high grade textile soaps and olive oil softeners. A special feature of their exhibit was various grades of hosiery made by different mills using their prime Italian olive soap and Nicetown olive oil softener. Joseph Leberman and John F. McNeill were in attendance.

W. H. Alexander, Bourse Bldg., Philadelphia, exhibited the Jumbo Diagraph stencil cutting machine, the largest ever built, cutting a 1 3/4-inch letter. This machine also cuts fractions. The regular Diagraph cuts 7/8-inch letters.

The Nonotuck Silk Co., through their Philadelphia office at 11th and Arch Sts., exhibited various lines of silks, both natural and spun, showing various grades of goods in and on which these yarns have been used.

JOSEPH A. FIRSHING

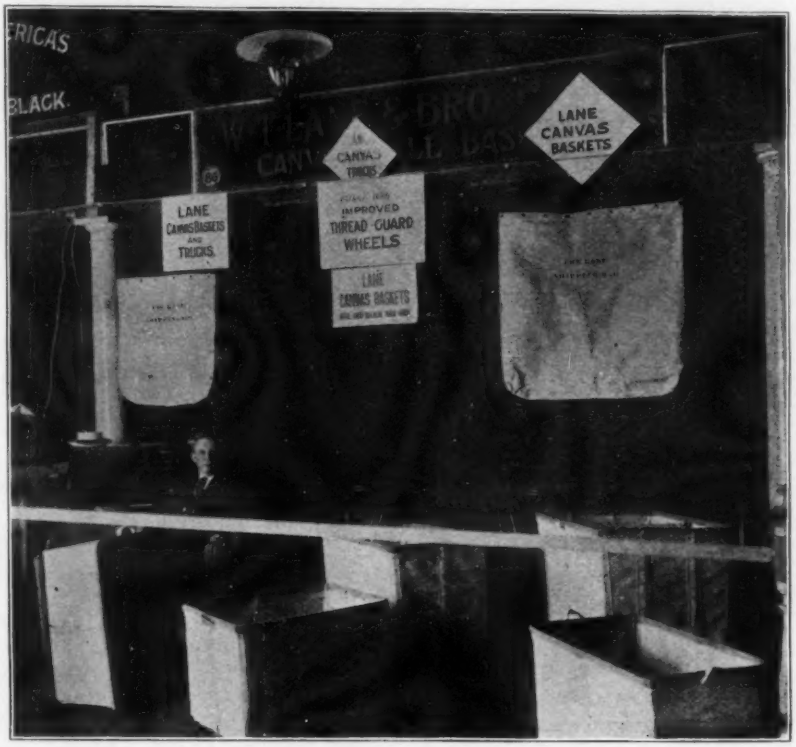
The S. K. F. Ball Bearing Co., whose headquarters are at 50 Church St., New York, had an interesting working model, showing the latest improvements in their ball bearings and ball bearing hangers, in connection with the exhibit of the Charles Bond Co. This exhibit demonstrated the great saving in power through the reduction of friction. The hangers showed the automatic aligning feature, which takes care, without sacrifice of efficiency, of shaft deflections. Their Philadelphia representative reports much interest on the part of textile manufacturers.

McConnell and Co., Ltd., Manchester, Eng., through their American representative, H. M. Remington, 113 Chestnut St., Philadelphia, exhibited in a well decorated booth the various kinds of fine cotton yarns which they manufacture.

The Nicetown Dye Works, Philadelphia, Pa., exhibited a fine line of samples of dyed hosiery and hosiery yarns in various shades, making a specialty of Hagar's "Intense Black," a color which has made a reputation for their plant, and which today stands as one of the best blacks for hosiery ever attempted.

W. T. Lane & Brother, manufacturers of Lane patent steel frame canvas baskets, canvas shipping hampers and coal bags, Poughkeepsie, N. Y., exhibited a full line of their canvas mill baskets, boxes and trucks, including oblong, round and square styles, canvas trucks with and without partitions, also canvas bags and baskets for shipping.

The Villa Stearns Company, 221 Fourth Ave., New York City, N. Y., through their Philadelphia representative, George Pfingst, showed their silk yarns in skein, cones, tubes, and the various other forms in use for knitting purposes. This concern had in operation two knitting machines, making a line of 25-cent plated silk half-hose, and plated silk boot women's hose for the same price. This firm has for the past few years been making a specialty of catering to the knitting trade.



W. T. LANE & BRO.

Harding and Fancourt, Inc., 516-18 South Delaware Ave., Philadelphia, displayed their usual line of soaps, softeners, oils, etc., for the hosiery and knitting trade. Their new Grecian softener for sulphur and aniline blacks imparts to the finished product a bright luster and soft feel. In addition to their Tuscan softener, which is well known to the trade, they showed a line of shredded soaps guaranteed to contain 88 per cent. of actual soap. Their shredded olive oil soap, which they recommend to hosiery dyers on account of its extreme dryness, and the high percentage of soap value it contains, is a very economical soap to use. Their flake palm and tallow soaps are dried by improved methods. The exhibit also contained a full line of olive oil which they import direct from Italy, also Turkey red oil and soluble oils.

Walter R. Ziegler, printer of bands, labels, rider tickets, box tops, etc., for the hosiery and knit goods trade, 33-35 Hancock St., Riverside, N. J., exhibited his line at booths 29 and 30. Manufacturers improved the opportunity to see illustrations of the value of hosiery printing. The exhibit included up to date and novel designs that manufacturers are using to increase the sale of their hosiery. Mr. Ziegler also demonstrated the methods used in the manufacturing of the goods, and gave convincing evidence that he operates one of the best equipped and most up to date hosiery printing establishments in the country.

The J. B. Ford Co., Wyandotte, Michigan, had a very attractive exhibit, tastefully fitted up with a full line of hosiery from leading manufacturers, also underwear, showing results obtained by their process of bleaching with Wyandotte products. Not only did their display include knit goods, but cotton yarns, sulphur dyes and mercerized yarns. Wyandotte soda and Wyandotte concentrated ash have become standard textile products. F. S. Klebart, field manager for the Textile Soda Department, was in attendance. He never misses a convention.

The Latham Machinery Co., whose main office and factory is at Chicago, and who have branches in New York, Boston, and Philadelphia, exhibited their full line, including the Monitor textile wire stitching machine for attaching tickets and labels to hosiery. They showed the Monitor corner stitching machine, which is used in a great many textile factories for making boxes. They are also agents for the Kramer baling machine, which is used for baling waste paper or other factory waste, which brings a higher price for the waste than when sold unbaled. The Latham Machinery

THE J. B. FORD COMPANY

Lacy & Hursh, 40 N. 6th St., Philadelphia, representing the Clipper Belt Lacing Co. of Grand Rapids, Mich., exhibited one of their latest Clipper belt lacing machines for the lacing of belts in an economical and rapid manner. This has been described in these columns. They are widely used in mills. The company also showed the metal lacings in cases, which they supply with each machine.

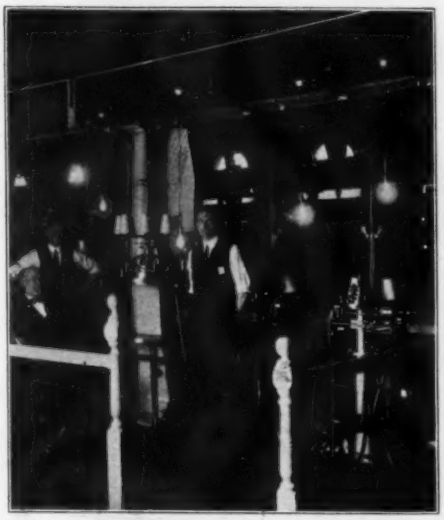
The J. S. Johnston Mfg. Company of Utica, N. Y., builders of drying machines, turning machines, loading machines for loading the tubular fabric on the pipe, button and button-hole marking machines, laying-up tables for cutting fabrics, special machines designed and made to order, exhibited their latest improved vertical drying machine for drying underwear in the roll. James S. Johnston, the head of the company, was in attendance to demonstrate the main features of the machine to parties interested.

Co. has made a specialty of wire stitching machines for the past twenty-five years, and are recognized as among the leaders in this line. The exhibit was in charge of Harry O. Latham, manager of the New York office.

One of the oldest established dyestuffs concerns in the country, a company which has been doing an extensive business with the knitting trade, Andreykovicz & Dunk, 58 N. Front St., Philadelphia, exhibited a full line of dyeing and finishing products for use in hosiery and knitting mills in general, for cotton, silk and mercerized goods, and developed and sulphur blacks on hosiery, also a line of olive oils, soaps, softeners, etc.

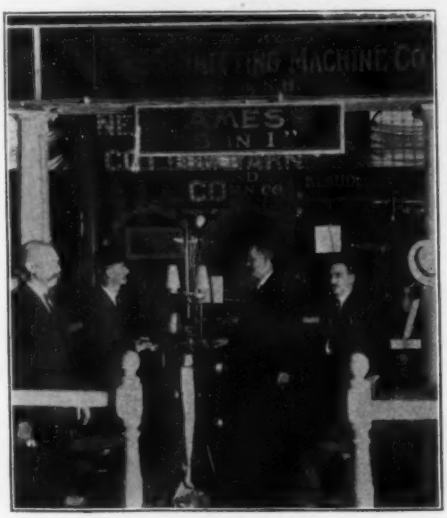
The H. F. Hofer and Company, Paterson, N. J., with New York offices at 260 West Broadway, showed a line of fabrics knit from silk yarns. This concern controls the output of the Haledon Silk Throwing Company's mills located in New Jersey, Pennsylvania and New York.

H. Brinton & Co., the well know manufacturers of knitting machinery at 213-217 Race St., Philadelphia, exhibited in operation a 13-inch.



H. BRINTON & CO.

8-feed body frame for ladies' underwear, a single-feed ribber equipped with their new 2-speed attachment, and their latest new style single feed ribber equipped with their latest improved stop motion.



A. N AMES KNITTING MACHINE CO.

The A. N. Ames Knitting Machine Co., Franklin, N. H., exhibited the Ames "5 in 1" full automatic seamless hosiery machine fitted with a motor for independent drive. This was recently described in detail in the Textile World Record. It attracted much attention on the part of the visitors, who were interested to see the new machine in operation.

The Beattie Manufacturing Company, Cohoes, N. Y., exhibited several of their Nonpareil two-thread loopers together with the latest models of trimmers attached to them. The trimmers are especially designed for hosiery, having knives made of the best Colonial steel and the brushes rotate most rapidly, positively cleaning the stitch. They also showed their new "Simplex" double sole and high spliced heel floating thread cutter for hosiery. William Beattie and H. Joseph Harrison were in attendance.

BEATTIE MFG. CO.

C. E. Hardenbrook Co., 44 N. 4th St., Philadelphia, and the Acme Staple Co., Camden, N. J., in a joint exhibition of their machines showed two models of the Union elastic button sewing machines, which were of much interest to the sweater and underwear trade. They also showed the new No. 30 "Acme" binder for attaching tickets to hosiery, etc., a machine which was recently illustrated in this magazine. Both Mr. Hardenbrook and Mr. Bernheiser, representing the Acme Staple Co., were in attendance to look after the interests of both concerns.

The Globe Thread Mills, a department of the New England Cotton Yarn Company, manufacturers of threads of all descriptions and for every purpose, showed samples of their thread for the shoe trade, the different cuttingup trades, and their different specialties for the knit goods trade. Their office at Philadelphia, 213 Chestnut St., had charge of the exhibit.

The exhibit of the Standard Machine Company, 12th and Callowhill Sts., Phila., comprised three machines, two of which were the "F" type, and the other one the latest word in the new Standard "G." One of the "F" machines had 120 needles 2 1/2-inch cylinder on children's footing, with a capacity of 20 dozen per day. The other "F" machine had 220 needles making the usual high-grade fabric in string work. The "G" machine is new in every detail, and is the result of constant study of

THE STANDARD MACHINE CO.

T. J. PORTER & SONS

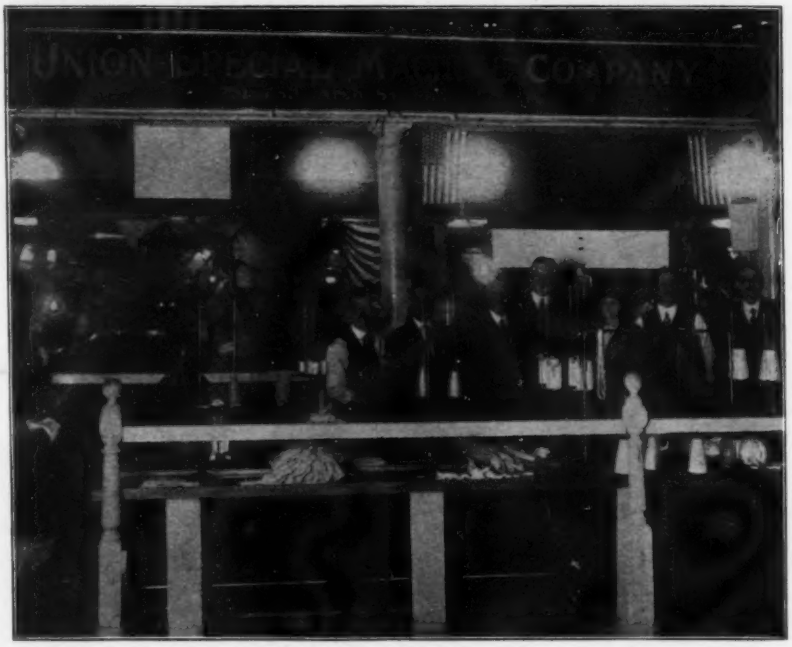
the needs of the trade with the object of producing a machine of extreme simplicity combined with good wearing qualities. The Standard "G" with 220 needles and a 3 3/4-inch cylinder making a full length ladies' hose with garter top, high spliced ankle, double sole and reenforced heel and toe, using 2/60s mercerized as a body yarn, has a capacity of 4 dozen and 13 stockings in a ten-hour day. This is said to be the largest production in this particular size ever produced by any seamless machine, with a quality of fabric never excelled by latch needles.

T. J. Porter & Sons, 119 S. Fourth St., Philadelphia, exhibited a full line of linen knitting yarns and demonstrated their working qualities on knitting machines. During the past year there have been many changes in hosiery styles demanding special kinds of hosiery and mercerized yarns, and they had a full line of all numbers from 2/40s to 2/150s, mercerized, gassed, cones or skeins, and also the plain and mercerized.

The George S. Weinerth Machine Co., Reading, Pa., exhibited their latest model Weinerth high splicing heel and sole floating thread cutting and turning machine. This machine is designed so that the operation of it was natural and tends to become automatic on the part of the operator. The cutting lever is in direct line with the putting on operation, which assures quick and accurate production. Their exhibit consisted of several of the later machines. Mr. Weinerth and Mr. Witsmiller were in attendance.

The Union Special Machine Company exhibited a model of the new bar-stitch machine, making the bar stitch and inserting the ribbon in the ladies' vests in one operation. In addition to this they exhibited a recently-perfected model of the selvage edge hosiery seaming machine, together with a dozen or more models of machines of interest to knit goods manufacturers. Their exhibition was in charge of a number of competent representatives.

The New England Cotton Yarn Co., Booth No. 8, offered an attractive display of combed and carded yarns, both grey and processed as adapted not only to the requirements of the knitting trade, but also for the weaving trade. This is their first yarn exhibit with the association since 1908, and they warmly welcomed their many friends at their booth, where every courtesy and attention was gladly shown them.



UNION SPECIAL MACHINE COMPANY

The United States Hoffman Co., Syracuse, N. Y., demonstrated the value of the "Hoff-man" knit goods presses at Booths 62, 63 and 64. These presses were in operation and in charge of competent operators. For many years the United States Hoffman Co. has been making a specialty of knit goods presses, sparing no expense to have them complete and perfect in all respects. The machines are specially adapted for pressing of underwear of all sizes, styles and lengths, and will give a garment any finish demanded by the trade. The "Hoff-man" machines turn out the best qual-

ity of work at a minimum expense, and one man or girl can do the work of three ordinary operators not using the "Hoff-man" presses.

UNITED STATES HOFFMAN CO.

KLAUDER-WELDON DYEING MACHINE CO.

The Klauder-Weldon Dyeing Machine Co. exhibited one of their 28 stick all phospher bronze machines, designed to dye cotton, wool and worsted yarns. On this machine yarns from 48-inch reeling to 78-inch reeling can be dyed. Their skein dyeing machines are so well known as to make any extended description of them superfluous. This company also exhibited for the first time a machine for dyeing fine hosiery, which attracted great attention because of the results that have been accomplished by its use. In the New Machinery department of this issue will be found a more extended description of this new machine, which is the creation of John H. Giles, vice-president and general manager of the company.

Alfred Suter, Textile Engineer, exhibited a complete outfit of yarn testing apparatus for spinning and knitting mills. Encouraged by the past year's business, Mr. Suter has studied the conditions and

ALFRED SUTER

requirements of the knit goods manufacturers in this line and the result has been the development of a few special machines to insure still greater accuracy and quickness in the testing of fabrics

W. H LORIMER & SONS CO.

and yarns. Among these were combers' percentage scales, yarn scales showing the number of both, cotton and worsted yarns or woolen, cotton and worsted yarns, silk scales, evenness controllers, reels, twist testers, single strands strength testers, the new electric conditioning oven with motor driven fan attachment to determine the amount of moisture contained in yarns and fabrics, and a scale which will show the dozen weight of hosiery by weighing but one pair of socks or stockings.

J. L. SHOEMAKER & CO.

J. L. Shoemaker & Co., 15 S. 6th St., Philadelphia, exhibited the latest models of the New Jersey wire stitcher. The machines were in operation attaching labels to hosiery, underwear, gloves and mittens. John Torjusen and Harry S. Band were in charge of the exhibit and explained to their visitors the merits of the machines and the ease with which they could be used.

The Peech Sons & Phillips Co., West and Clinton Sts., Camden, N. J., one of the new exhibitors, showed various lines of mercerized cotton yarns, which they are selling to the knitting trade. They demonstrated their various grades of yarn on a new and novel knitting machine built by the Pigeon Machine Co., Jasper and Orleans Sts.

The Merrow Machine Co., of Hartford, Conn., exhibited the usual number of standard model machines, recognized as superior for hemming, seaming and edge finishing knit underwear, sweaters and other knit goods, including finishing knitted silk neckties and the like. Style 60S machine for welting the tops of ladies' stockings has met with various refinements during the past year and the style 60UD for toe closing has more than met expectations. The new Merrow catalogue, which attracted much attention, contained much information concerning new models not described in their previous issue. Style 35E machine, a new and improved model, makes a shell stitch much like that of the other Merrow machines. E. H.

MERROW MACHINE CO.

Allen of their Philadelphia office was in charge and with his assistants welcomed his friends. P. G. Merrow was in attendance part of the time.

Richard A. Blythe, Inc., Mariner & Merchant Bldg., Philadelphia, representing the Lehigh Valley Silk Mills of South Bethlehem, Pa., fitted up a temporary office with chairs and a desk in their booth for the reception of their customers. Samples of their various grades of silk for the knitting trades were shown and received much attention.

In a tastefully decorated booth Brown and Schaeffer, in charge of the selling department of Thomas Wolstenholme & Co., spinners of French and Bradford spun yarns at Kensington Ave. and Westmoreland Sts., Philadelphia, received their many friends and customers from all parts of the country and others desiring to investigate and sample the various grades of yarns for which they are so well known among the trade, and on which the plant is so busily engaged at the present time.

C. Walker Jones, treasurer of the Beckert Needle & Supply Co., manufacturers of German needles, and president of the Currier Needle Co., with factory in Manchester, N. H., as usual occupied a space into which he removed his offices from their Germantown address at 4929 Greene St., Philadelphia, for the week of the show. Mr. Jones for the past ten years has been studying the needle wants of the knitting trade and has made many friends, many of whom visited him during the exhibition. He was assisted in receiving the trade by Mr. Welthall and Mr. Evans.

New York Revolving Portable Elevator Co., Jersey City, N. J., showed two of their standard revolvators, one of the hand power type, and the other motor driven. The hand power machine was equipped with all the improvements made within the past year, in addition to some of those shown at the National Printing and Advertising Exposition at the Grand Central Palace, New York, all of which make the revolvator even more efficient than it has ever been before. The motor driven machine had a device by which the ascent and descent is under the control of the man riding

N. Y. REVOLVING PORTABLE ELEVATOR CO.

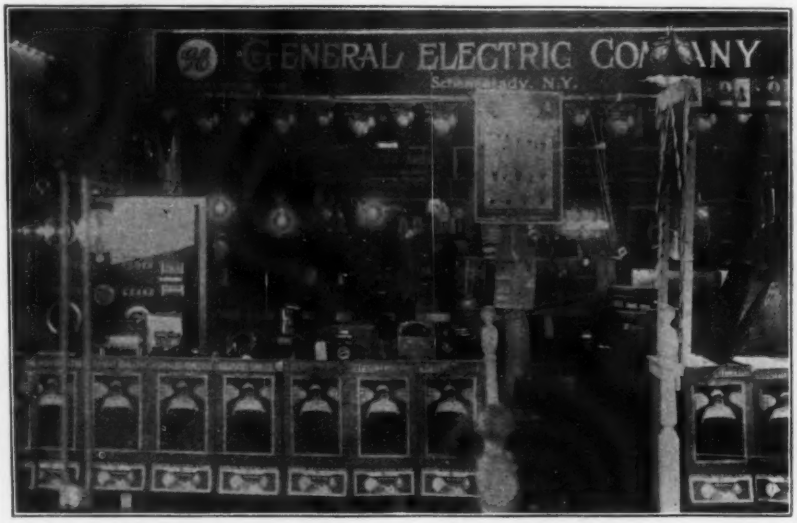
on the platform, and can also be operated on the floor. It is a great advantage to have the machine operated on the platform, for in tiering goods the man can ride up with the load, and it is not necessary for the man on the floor to operate the machine.

The General Electric Company, the world's largest electrical manufacturer, had on exhibition a line of electrical apparatus of special interest to hosiery and underwear manufacturers. The electrically heated hosiery boards first exhibited last year have been still further improved. The

boards for drying ladies' hosiery are provided with a removable tip and two tips of different lengths are supplied with each board enabling the manufacturer to use the same board for two sizes. A third tip can be supplied if desired, so as to permit the use of one board for three sizes. Operating tests extending over a long period of time were made in a large hosiery mill and these tests show the cost of drying was reduced 40 to 50 per cent., while the output per day was doubled. The time of drying can be reduced to three minutes. The electrically heated metal board has a permanently smooth finish which eliminates any possibility of tearing the hose. The temperature of the electric board can be closely regulated, which ensures retaining the fine finish on all grades. As

The Southern Textile Machine Company, Paducah, Ky., exhibited their new Wright-looper, built for looping all grades of hosiery and underwear. The company also had a model of their machine running without a dial. R. A. Vine, their sales manager with offices at 1522 N. 59th St., had charge of the exhibition and had associated with him Mr. Lack, the president of the company, and W. C. Wright, the inventor of the new machine.

Palm, Fechteler & Co., 67 5th Ave., New York, exhibited a line of gold transfer stamps for marking hosiery, knit underwear and other knit goods by the Delcalcomaine process. Among their exhibits were some very fine novelties of their own creation. Every manufacturer can have his own



GENERAL ELECTRIC CO.

these boards are practically indestructible, there are no renewals. Extra sets of boards are not required, as the hose dry practically as fast as boarded and duplicate sets are not required for different colored hose, for the metal board does not transmit stains. A feature of these boards is the seam groove, a shallow groove extending from heel to base, and about 1/8 inch in from the back edge. This greatly facilitates placing the seam, and insures uniform results with each pair of hose. They also showed their electric color matching equipment which has been described in this journal. Cloth pinions were shown; they are unaffected by atmospheric or temperature changes and will operate without deterioration even in hot oil. Another novelty exhibited was the "ozonator," an adjunct to ventilating systems to clear the air of organic matter and oxidizable poisons. It provides ozone for pure air in connection with ventilating systems. A line of industrial heating devices was exhibited as well as Mazda lamps, textile motors, switches, etc. The General Electric Company supplied numerous motors to exhibitors where machinery was operated.

designs according to his ideas or the brands of goods manufactured. The Philadelphia agent, R. S. Miller, 5506 Wyalussing Ave., and E. S. Tucker of New York were active in the exhibit. J. A. L. Miller, manager for Palm, Fechteler & Co., was in charge.

The Rhode Island Processing Company, with R. H. Crowell of the Providence office and W. R. Gillespie, Sr., secretary, treasurer and general manager of the company, in charge, exhibited a fine line of cotton yarns, mercerized, dyed and bleached by them. The exhibit consisted of yarn on cones, tubes, skeins, etc.

The Grand Rapids Textile Machinery Co., manufacturers of the Shields Webb Folding and Cutting Machines, Grand Rapids, Mich., were unable to get adequate space in the exhibition hall and so did not exhibit their line of machinery. C. E. Collier, treasurer and manager, and Mr. Shields, vice-president and inventor of the Shields method of handling cloth, were present during the week and made their headquarters at the Bellevue-Stratford Hotel, where they entertained their friends and customers.

Edwin A. Newton, dealer in new and second hand knitting mill machinery, exhibited, in addition to the various knitting mill supplies handled at his establishment at 310 North 4th St., Philadelphia, a number of cylinders and dials, which he supplies to the knitting trade.

The Roessler & Hasslacher Chemical Co., 100 William St., New York, displayed a full line of peroxide bleached textiles, such as wool, cotton, silk and mixtures in yarns, woven goods, hosiery and underwear. Hosiery manufacturers have been interested in bleaching successfully a mixture of silk and cotton and many such manufacturers have been instructed in doing the work by the peroxide process. The peroxide process was demonstrated in a number of miniature vats of glass during the exhibition. Visitors thus obtained an excellent idea of peroxide bleaching. Experts were in attendance and explained the subject thoroughly.

ROESSLER & HASSLACHER CHEMICAL CO.

The O. F. Zurn Co., Lehigh Ave. and Broad St., Philadelphia, showed their line of cotton and silk softeners in an attractive display, which included Turkish softener, glycerine softeners, glyco developer, Jap-A-No silk oil and bleacher hosiery oil. John M. Zurn, president of the company, was in constant attendance, assisted by J. L. Wilson, manager, and H. B. McKinley.

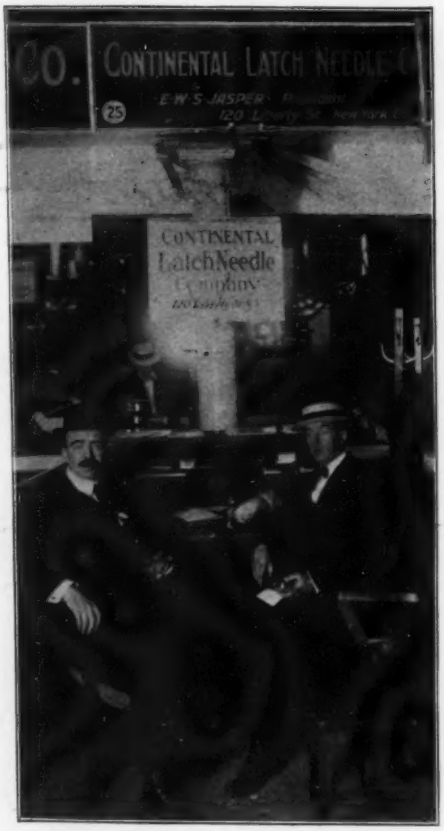
Schaum & Uhlinger, Glenwood Ave. and Second St., Philadelphia, exhibited one of their latest improved electric driven self-balancing, hydro-extractors, with motor attached to the top of the machine, having a 42-inch copper basket. They claim this to be one of the best and easiest operated extractors on the market. The machine, when in operation, attracted considerable attention, due to its cleanliness, being practically noiseless, which is unusual in a machine of this kind running at such a high rate of speed. Mr. Schaum of the members of the company gave the exhibition his attention and explained to those interested the many points of value on the machine.

SCHAUM & UHLINGER, INC.

The William H. Lorimer's Sons' Company, Ontario and Lawrence Sts., Philadelphia, had their exhibit in a tastefully and artistically decorated booth, showing a handsome American flag built up of mercerized yarns. The various grades of mercerized yarns both plain and dyed for the hosiery and underwear trade were displayed. The members of the company in attendance were Joseph H. Lorimer, E. D. Lorimer, H. T. Nekevois and H. R. Brooks.

Albert Ivins Croll, M. & M. Bldg., Philadelphia, Pa., exhibited a full line of samples from the Sharp Mfg. Co.

The Continental Latch Needle Co., 120 Liberty St., New York, exhibited samples of the German latch and spring beard needles which are so well known to knitters. Their Continental needle is made in Germany by Theodor Groz & Soehne, Ebingen, who, in 1852, commenced making knitting machine needles by hand with two workmen and two boys. Today, 61 years later, they have



CONTINENTAL LATCH NEEDLE CO.

three factories, employing 850 workpeople, the result of integrity and perseverance. Mr. Jasper, president of the company, was in charge of the exhibition.

The "Textile World Record's" booth served as a reception room for their friends and customers, and headquarters for members of the staff. The Lord & Nagle Company's various textile publications, directories and books were on sale. Frank L. Nagle, president; Henry G. Lord, treasurer; William J. Flesh, the Philadelphia manager, E. H. Morningstar and A. H. Tyler, New York manager, were in attendance during the week.

The other textile publications represented at the show consisted of the following journals: "Cotton," Atlanta Ga.; "Knit Goods," New York; "Posselt's Textile Journal," Philadelphia; "Textile American," Boston, Mass.; "Textile Manufacturers' Journal," New York, and the "American Wool and Cotton Reporter" and "Fibre and Fabric," Boston. All had representatives on the floor for the purpose of reporting the convention and exhibition and entertaining their friends.

The Charles Beck Company of 609 Chestnut St. exhibited the famous Brehmer pointed staple textile stitcher, which is used for attaching rider tickets and brand labels to hosiery. This is the machine of which all told there have been over 60,000 sold. The "Brehmer" was shown in different styles. Foot and belt power machines were in operation where customers' samples were stitched, thus enabling the prospective purchaser to see just what the machine will do. A large line of papers was shown, such as glazed, cheviot and other grades, which were of interest to the hosiery man in covering his boxes. Trademark papers and other distinctive and individual designs were exhibited.

CHAS. BECK CO.

The Charles Bond Company, 520 Arch St., Philadelphia, one of the largest textile mill supplies in the country, manufacturers of transmission machinery, leather belting and general mill supplies, exhibited a line of mill supplies for use in textile plants, including the Veelos Balata belting, the Grundy patented insulated coupling for direct connections, all steel oil cans with soldered joints, the Bond new steel hangers and other appliances. As has been their custom in the past the Bond Company equipped the exhibits in the hall using power, with belting, shafting and hangers, giving a demonstration of the value of these goods in practical use. Their patent ring oiling universal shaft hanger attracted much attention.

This hanger needs no introduction to the American hosiery manufacturer, the Bond hanger having been used for years by experts at the hosiery conventions. In addition to the cast iron hanger,

CHARLES BOND CO.

they drew the attention of manufacturers to the advantages of their Lytestrong pressed steel

ACME KNITTING MACHINE AND NEEDLE CO.

hanger, which is rapidly coming into general use. The Lytestrong hanger is scientifically constructed. The metal, as folded, gives great strength and rigidity. As the name signifies, the hanger is not only strong, but light in weight, being only about one-half the weight of a cast iron hanger. The Lytestrong has a perfectly flat base, which, as all millwrights know, is very important in erecting. All rivets are in shear to the greatest strain, the foot of the hanger being substantially reinforced with foot bolts, the yoke being interlocked on inside of leg.

The Acme Knitting Machine & Needle Co., of Franklin, N. H., occupied a convenient corner location where the Acme and Hemphill seamless hosiery machines, which they exhibited, were easily accessible. These machines are well known to the trade and each year are tuned up to a higher point of efficiency. This company also manufactures a complete line of latch needles. Mr. Duffy, manager of the company, with his assistants, was in attendance during the week.

Tolhurst Machine Works, Troy, N. Y., exhibited one of their well known direct connected electric driven hydro-extractors. The three bearings on which the machine is mounted are entirely under the case and out of the operator's way.

TOLHURST MACHINE WORKS

This allows trucks to run close to the machine at all points. The extractor is equipped with a mechanical oiling device by which the bearings were kept lubricated at all times. A centrifugal pump connected with the basket spindle throws a stream of oil into the bearings, the oil flowing back through a fine screen to the oil well and is used over again. This machine, which represents the most improved methods of hydro-extracting, attracted the attention of a large number of visitors and called forth many favorable comments.

The National Association of Cotton Manufacturers.

The ninety-fourth meeting of this Association was held in Huntington Hall, Institute of Technology on April 23 and 24.

EDWIN FARNHAM GREENE, REELECTED PRESIDENT.

The first session began with the reading of the secretary's report, which was in part as follows:

SECRETARY'S REPORT

As an organization is just what its members make it, it is worthy to note the intense loyalty of the members of this Association to its measures and interests, especially to the great amount of work which has been applied by the authors of papers in the special investigations bearing upon the many problems of cotton manufacture, and as one class of difficulties is surmounted, others are revealed, and in this manner is indicated the general advance of the cotton manufacture.

These united efforts have made this Association a thoroughly vital organization, keeping in the forefront of the lines of its work. It is indeed necessary, in these times, to be aggressively active

in any line of work if difficulties are to be surmounted and results attained.

In a recent work on the subject of the American cotton industry by an author who gives the sources of his information in foot notes, nearly all of the citations pertaining to the technics of cotton manufacturing are credited to the Transactions of this Association.

The Board of Government has held five meetings during the year, at which the affairs of the Association and its policy have been carefully laid out, as has been indicated by the records of the meetings.

MISCELLANEOUS WORK

It is gratifying to relate that during the past year this Association has been requested to take up with general questions of the interests of cotton manufacturers to a greater extent than ever before in its history. Problems of all natures and scopes are being constantly submitted to this Association, and whatever may be the success of efforts on these matters, the many letters of appreciation from members of the work of the Association on their behalf has been a source of satisfaction.

SPECIAL COMMITTEES

The reference of many important questions to special committees has been extended to a greater degree, and the line of work which may be represented by the Standard Sales Notes has been applied to important committee work in regard to the methods of testing cotton yarns and fabrics, which will be presented in brief at this meeting, reserving for the Transactions further information on the subject. The importance of basing mercantile transactions in cotton yarns and cotton cloth on the amount of the fiber delivered, irrespective of the water, which has been so long a recognized principle in transactions of the valuable silk fiber, and more latterly in wool and worsted, is being recognized in cotton, and the economic value of the practices based upon the information obtained in these investigations will be very great in all the commercial transactions of the cotton manufacture to which they apply.

THE NATIONAL COUNCIL OF COTTON TO AMERICAN COTTON MANUFACTURERS

The close relations with The American Cotton Manufacturers' Association which have existed for many years have assumed a more concrete and organized shape, and await the action of this Association for confirmation upon a basis submitted below.

In accordance with concurrent resolutions of this Association and The American Cotton Manufacturers' Association, two committees, consisting of Messrs. Edwin Farnham Greene, Franklin W. Hobbs and Charles T. Plunkett of this Association, and Messrs. William A. Erwin, D. Y. Cooper and Ellison A. Smyth of The American Cotton Manufacturers' Association, with the respective secretaries of the two organizations, met at New York City, October 23, 1912, and after thoroughly canvassing the subject, drew up the rules governing the proceedings of The National Council of American Cotton Manufacturers, which, in the following modified form, were adopted on April 10, 1913, at a meeting of The American Cotton Manufacturers' Association, held at Washington, and are submitted for action at this meeting.

MEMBERSHIP

The membership on May 1, 1912, was 983. There have been 29 resignations and 10 deaths during the year, and 20 were elected at the September meeting, making the membership 964 on April 24, and this report will be amended before publication in the Transactions, bringing the actual membership up to May 1, 1913, as may be changed by members elected at this meeting.

The Association has held as usual two meetings during the year, one at Boston, April 24-25, 1912, and one at The Griswold, New London, Conn., September 9-11, 1912.

The report of the medal committee was made by Franklin W. Hobbs, chairman, who awarded the association medal to Arno Schmidt, secretary of the International Cotton Federation, Manchester, Eng., for his report on cotton cultivation in Egypt and India. Mr. Schmidt was unable to be present as had been expected. Mr. Hobbs stated that the medal committee had decided to award a special medal to Stuart W. Cramer, chairman of the tariff committee of the American Cotton Manufacturers' Association, for his work in connection with the revision of the cotton tariff. Mr. Cramer made a brief, but appropriate acknowledgment of this mark of the association's approval of his work.

Richard C. MacLaurin, president of the Massachusetts Institute of Technology welcomed the association in behalf of the Institute. He called attention to the fact that the cotton industry was attracting a higher grade of intellect and stated that much of the general criticism of industrial conditions was unwarranted and the result of ignorance of the actual conditions. Gov. Foss, who was scheduled to deliver an address of welcome was unable to be present, and his place was filled by the Lieutenant Governor, David I. Walsh, who was introduced by President Greene as a man of whom they had very favorable reports. Lieut. Gov. Walsh welcomed the association to Massachusetts, and spoke of the need of some connecting link between cotton mnaufacturing and the large number of young men who spent years in gaining an education, only to find it impossible to obtain a posi-

tion where their training and knowledge could be put to practical use. Frederick B. Macy, treasurer of the Soule Mills, New Bedford, Mass., made a response to the Lieutenant Governor's address.

President Greene next delivered his address, which was as follows:

PRESIDENT'S ADDRESS

Once more we are met together as an Association of cotton manufacturers. Since our last meeting in New London in September, nothing of unusual importance has taken place in the industry. It is safe to say, that the business of the cotton mills of the country has not improved during the past seven months, and is on the whole, poor. To be sure, there is no such radical curtailment taking place in this branch of the industry as among the woolen and worsted mills, but even though production and sales are larger the goods have been sold at little or no profit. The temporary prosperity of the coarse goods mills has been more than offset by the lack of business in fine goods. This is not surprising in view of the many uncertainties before us. The most important event to us during the past few months has been the change in the administration with the complete control of Congress passing to the Democratic party. This need not necessarily mean poor business for us nor for the country at large, but such a radical change is always disturbing, and particularly so when the successful party has been advocating radical changes in the federal statutes.

We all of us, whether Democrats or Republicans, feel that the Democratic Party has at the present time the opportunity of years to so shape legislation that the business of the country, which after all is the basis of its prosperity, will not be seriously disturbed. In fact, it will only be natural if those who are now in power are more conservative in their plans with the broader knowledge and larger experience which actual contact with these problems brings. Moreover the dominant party is likely to be the conservative party feeling the full weight of the responsibility of the nation's progress.

We are not willing to admit that the textile manufacturers in this country are any less progressive in the true sense, or less interested in the real welfare of the people of this country than are our fellow citizens. Owing to a combination of most unfortunate circumstances we seem to have been picked out for special attack. There is no question but that progress can be made and is being made along many lines to improve the conditions of the working people, and the textile mills have been leaders in this respect. No industry in this country has on the whole better mills or factories than the textile industry, and no class of operatives work under more favorable conditions than the vast majority of the textile workers, most of whom spend their time in well lighted, and well ventilated rooms, and in most cases amidst more healthy surroundings than their own homes. It is true there are many exceptions to this general statement, and it is highly probable that our friends who are on the outside can point out many things which can still further be improved, but I wish it distinctly understood that every manufacturer most earnestly desires that the real facts regarding conditions of work and wages be known to the world at large for we have suffered more than we feel we deserve.

Our wages may seem low to many, but when the character of the operatives is considered with reference to what they can earn elsewhere, we shall all undoubtedly come to the conclusion that the textile industry is of very great economic advantage to this country and its people.

I hope at this time to analyze the character of the working people in our textile establishments, the wages paid and the effect of the tariff on such wages. I cannot, of course, in a few minutes hope to more than point out some of the facts which I sincerely believe are representative of the whole industry. The statistics are from the Pacific Mills, which, as you know, are situated in Lawrence. I do this, first, because I can get at the actual facts and, second, because the people of this country seem to believe that Lawrence is a representative New England textile city. The Pacific Mills is moreover a good source of information for the reason that we have a worsted mill, a cotton mill and a finishing works, comprising, with the exception of silk and jute, almost the whole range of the textile industry from the raw material to the finished product.

First, as to the character of the people. For years, hundreds of thousands of foreigners have been streaming into our country, in some single years more than a million, and little thought seems to have been given as to how all these people are to be given employment even in this large country. Most of them are not skilled laborers. At the present time the Pacific Mills are employing in Lawrence more than 7,000 operatives comprising thirty odd nationalities, fairly well distributed among them all. Quoting from Mr. Parker,—"To follow a bit of cotton or wool from the bale to the finished product would serve to introduce one to the various nationalities about as follows: The bale would be unloaded from the car by an Austrian Polander, a farmer at home, who prefers to work out of doors. When trucked to the picker room it is handled by Syrians, not long in the country and not familiar with mill work. These men are quiet and industrious, they soon learn our language and apparently are here to stay. Next it goes to the card room, where many of the men who tend the cards are Portuguese; they do not speak English, nor can they read and write in their own language. On the roving frames we find middle-aged Irish girls who have worked for years as frame tenders. Next comes the spinning room, and here the girl spinners are young French-Canadians or children of French-Canadian parents, quick and active, with nimble fingers. In the weaving also we find the French-Canadian weaver, 70 per cent., and she is an excellent worker, a few English and Irish still survive, but are out-numbered. The Canadian girl is not over-anxious to learn English, she has plenty of companions who speak her native tongue

and she does not feel the need of other friends. She is apt to return to Canada for a visit quite frequently. In the worsted weaving another class has recently appeared unobtrusively—weavers to the number of over two hundred from France and Belgium. These are energetic workers and have taken a place near the front rank in earnings. When the woven cloth goes to the print works we find still another nationality handling it. Not many French-Canadians and not a single Portuguese. The printers and engravers, skilled workmen who begin in boyhood and serve seven years learning their trade, come mainly from England and Scotland; 32 per cent. of all the operatives in the print works were born in England. In one of the dyehouses difficulty was found in getting men who could endure the dampness, and it was only when some Russians from the North Baltic provinces were hired that men were found who could work all day with their hands in cold water. Greeks who are said to be quite numerous in Lowell are not plentiful in Lawrence. In the worsted spinning room young Italian boys have recently been tried as spinners and make a good impression."

According to statistics gathered by the United States Immigration Committee in May, 1909, when actual returns were made of 4,911 of our operatives, not including office employees, sixty-one out of every one hundred foreign-born could speak, read and write in English, twelve could speak but not read and write, while twenty-seven were wholly ignorant of our language; of this latter thirty-nine—twenty-seven could read and write their native language, but there were twelve who could not. Thus will be seen that the textile mills of the country give employment to a large number of these immigrants who are frequently illiterate, with no skill and not even natural ability of hand or mind.

Turning to the question of wages, at the end of this address I have appended three tables (Table 1, a, b, c), giving the actual wages paid in each one of our three departments for the week ending December 14, 1912, as returned to the State House. These tables show the number of males and females (eighteen years of age and over), and the number of young persons (under eighteen years of age) with the actual wages of each class. Bearing in mind the character of people to whom we give employment it will be interesting to study these statistics. I also attach three tables (Table 2, a, b, c), giving some interesting statistics about a few of the employees in some of the more important departments of the mill. These tables are given not to show the average wages in these departments, but as practically all this work is piece work, it shows what can be done by foreigners who have little or no education or skill. It is a fair statement to make that these wages are possible to any able-bodied person of reasonable intelligence after a few weeks' experience.

I sincerely wish, as I believe we all do, that we could pay even higher wages, for it is to the interest of all in the long run. There are, however, certain economic laws such as the law of demand

HOURLY EARNINGS IN THE UNITED KINGDOM AND IN THE UNITED STATES IN DIFFERENT OCCUPATIONS IN THE COTTON INDUSTRY. TABLE 3.—(*a*)

OCCUPATION AND SEX.	Number of operatives and average hourly earnings.						Relative Earnings per Hour (Base 100—The United Kingdom.)		
	The United Kingdom.		The United States.						
			Northern States.		Southern States.				
	No.	Average Hourly Earnings.	No.	Average Hourly Earnings.	No.	Average Hourly Earnings.	The United Kingdom.	The United States.	
								Northern States.	Southern States.
Weavers,									
Male (piecework)	16,140	$0.1105	3,959	$0.1719	949	$0.1469	100.0	155.5	132.9
Female (piecework)	46,145	.0901	5,395	.1609	553	.1284	100.0	178.6	142.5
Mule spinners:									
On coarse and medium yarns, male (piecework)	4,990	.1688	157	.2486	. . . .	. . . .	100.0	147.3	. . . .
On fine yarns, male (piecework)	3,997	.1877	41	.2533	. . . .	. . . .	100.0	135.0	. . . .
On very fine yarns, male (piecework)	1,273	.2016	116	.2034	. . . .	. . . .	100.0	145.0	. . . .
Ring spinners:									
Female (time-work)	3,252	.0658	1,081	.1202	. . . .	. . . .	100.0	182.7	. . . .
Female (piecework)	947	.0732	1,382	.1343	617	.0943	100.0	183.4	128.8
Total,	4,209	.0675	2,463	.1282	617	.0943	100.0	189.9	139.7
Spoolers:									
Female (time-work)	385	.0577	234	.1182	45	.0894	100.0	204.8	170.5
Female (piecework)	11,837	.0672	845	.1225	431	.0902	100.0	182.3	131.2
Total,	12,222	.0669	1,079	.1216	476	.0901	100.0	181.8	134.7
Fine and jack frame tenders:									
Female (time-work)	162	.0753	104	.1528	. . . .	. .	100.0	203.0	. . . .
Female (piecework)	6,515	.0836	1,166	.1503	129	.1292	100.0	179.8	154.5
Total,	6,677	.0834	1,270	.1505	129	.1292	100.0	180.4	154.9

and supply that work inevitably in spite of all legislation or sincere desire on the part of some to improve the conditions. The truth is that the great majority of the textile operatives are worth no more and could not possibly earn even as much in other industries.

The cotton mills and woolen mills in this country are the training school for hundreds of thousands of work people, transforming them from ignorant and clumsy foreigners into skilled, self-respecting educated Americans.

Before passing from this question of wages, I wish to call attention to the fact that the textile industry as a rule gives steadier employment to its operatives than most of the so-called skilled trades such as plumbers, carpenters, masons, etc., and

(*b*)

WORSTED DEPARTMENT.

Classified Weekly Wages (Rates) Wage Earners Only.

December 14, 1912.

Specified Wages (Rates) Paid for the Week of Employment of the Greatest Number.	Adults. (Eighteen Years of Age and Over.) Males.	Females.	Young Person (Under 18 Years of Age.)	Totals.
Under $3,	0	0	0	0
$3 but under $4,	0	0	0	0
$4 " " $5,	1	2	2	5
$5 " " $6,	4	15	47	66
$6 " " $7,	48	150	235	433
$7 " " $8,	201	307	108	616
$8 " " $9,	699	253	52	1,004
$9 " " $10,	92	115	13	220
$10 " " $12,	149	180	9	338
$12 " " $15,	229	162	2	393
$15 " " $20,	242	2		244
$20 " " $25,	13			13
$25 and over,	20			20
Totals,	1,698	1,186	468	3,352

(*c*)

PRINT WORKS.

Classified Weekly Wages (Rates) Wage Earners Only.

December 14, 1912.

Specified Wages (Rates) Paid for the Week of Employment of the Greatest Number.	Adults. (Eighteen years of Age and Over.) Males.	Females.	Young Persons (Under 18 Years of Age.)	Totals.
Under $3,	0	0	0	0
$3 but under $4,	0	0	0	0
$4 " " $5,	0	0	0	0
$5 " " $6,	2	7	36	45
$6 " " $7,	8	53	99	160
$7 " " $8,	187	87	40	314
$8 " " $9,	300	2	18	320
$9 " " $10,	164	2		166
$10 " " $12,	82	9		91
$12 " " $15,	90	3		93
$15 " " $20,	37			37
$20 " " $25,	25	1		26
$25 and over,	69			69
Totals,	964	164	193	1,321

therefore it is only fair to compare total wages received by these with the total wages received by a textile operative who usually works a full fifty weeks in the year. There have unfortunately been exceptions during the past two or three years, particularly in the worsted business. A great deal of curtailment has been made necessary because of unsettled business conditions.

Much has been said in the past to the effect that a high protective tariff does not benefit the workman particularly in the textile business. It should be conclucive proof to quote from the Tariff Board Report on Schedule I (Table 3, a, b), which clearly shows that the operatives of the cotton mills of the Northern and even the Southern states receive wages considerably in excess of these paid in the United Kingdom. Moreover, it is a well-known fact that the wages in England are higher than those of the Continent. Every well-informed person knows that the cost of living in England is not proportionately lower than in America; fuel and clothing are somewhat cheaper but foods and rents are on the whole as high in England as in the textile districts of this country. To be sure, the operatives abroad do not spend as much on the luxuries of life such as the latest style hats and moving picture shows.

I believe it is very generally accepted now that the cotton mills of this country, as a whole, have not made large profits; at least, sufficient authentic information has been brought to the attention of the public to establish this fact. Many failures and reorganizations in the past ten years testify further to this. No one denies that certain companies, which have been exceptionally well managed over a long period of years, have shown large profits, but this will always be true. If the tariff is reduced to the point that goods can be imported into this country below the cost of manufacturing, either the raw material must be purchased for less, wages reduced or capital go without remuneration, assuming that the mills are now economically and efficiently operated, and the intense domestic competition of years has guaranteed this. The price of cotton is dependent on the law of demand and supply and is beyond our control. In spite of all legislation, capital will not continue in a business which does not give some return. The only chance therefore to meet foreign competition is by reduction in wages which no one wishes to see. Working people cannot afford it and the mills do not wish to do it. I wish it distinctly understood that I am not making any threat that wages will be reduced because I know that manufacturers will resort to this only at the very last. No one denies that the textile industry is a very vital part of the business of this country and any injury to the industry cannot but help affecting the welfare of the whole country.

The industry as a whole is facing this crisis. Some of the manufacturers making coarse goods may feel that because of the fact that a certain small percentage of the coarse goods made in this country is exported that they are free from tariff disturbances. This is not true, for if the fine mills are forced off of the finer grade of goods they must necessarily look for other outlets, and inevitably the industry as a whole will suffer if any particular part suffers. It should therefore be apparent to all that this is the time to get together and work for our common interest. If any one from the attorney general's office is interested in ascertaining whether a trust or any working agreement exists among the cotton mills, let him come to some one of our meetings where we are trying to secure united action on some vital point. There is probably in this country no industry where there exists more intense competition or a stronger feeling of independence on the part of the individual manufacturers, and yet it is to be hoped that in meeting this coming crisis we will all work in closer harmony so that the enormous advantages of the cotton mills to this country can become widely known to the end that our home industry may be preserved on a stable and sound basis.

At the close of the first session a group of those in attendance was photographed on the Boylston St. steps of the hall. The afternoon session began with the reading of a very interesting paper on

THE NEW AGRICULTURE IN THE SOUTH AND ITS RELATION TO THE COTTON SPINNING INDUSTRY

By DAVID R. COKER, Hartsville, S. C.

The agriculture of the cotton states is just entering upon a new era. The majority of our farmers are still following in the old ruts, planting the bulk of their land in cotton year after year, depending largely upon fertilizer to keep up production and exhausting the life-giving humus of the soil by the continued use of a clean culture crop. In many places, however, evidences of improved methods are seen. The work done by the United States Department of Agriculture through the plant breeding, farm demonstration and other bureaus during the past decade is beginning to bear fruit. Many of our state agricultural colleges, departments of agriculture, and experiment stations are also doing effective work in the improvement of agricultural conditions. Here and there individual farmers of a high type of intellect are taking up and solving problems which mean millions of dollars to southern agriculture. Associations for the breeding of animals and plants have been recently formed in a number of the states.

The cotton spinning industry of the United States depends almost exclusively on the south for its supply of raw material and it is natural to suppose that the radical change which is now taking place in southern agriculture will affect the spinner at some point.

The writer has been a buyer and stapler of cotton for sixteen years and a breeder of cotton and other plants for ten years. He has, in order to foster the general agricultural welfare of his community and properly carry on the large farming operations entrusted to his care, established what is now recognized as the largest and most complete plant breeding and experimental farm under private management in the southern states. He has been for years in close contact with a number of the southern cotton mills in his ca-

pacity of cotton buyer and staple expert and has sought in his cotton breeding work to solve some of the raw material problems of the mills with which he was in touch. This varied experience would seem to give him a right to speak with some degree of authority on the subject before us.

The new agriculture of the south contemplates a severe reduction of the cotton acreage, but not a reduction of the crop. A restoration of the depleted humus is necessary, not only for the enrichment of our soils, but is equally necessary in rendering the crops comparatively immune to the effects of a deficient or an excessive rainfall. This restorative process requires the frequent seeding of the land to crops which leave a large quantity of vegetable matter to be plowed under. One of

DAVID R. COKER.

the most practicable crops for this purpose is corn, our southern practice being to plant peas in the middles and turn under the pea vines and corn stalks after the ears are gathered. A few years ago E. McIver Williamson, of my own county, discovered a cultural method for more than doubling the yields of corn and since then most of the farmers in eastern South Carolina have been able to abandon their former practice of importing from the west the bulk of their supply of this grain. A notable impetus to the production of this crop has also resulted from the world's record yields of 255 bushels on one acre made by Captain Drake of Marlboro County, and of 228 bushels on one acre made by Jerry Moore, the illustrious boy farmer of Florence County. Both of these phenomenal yields were made in eastern South Carolina in which the author resides. Though it does not bear on our subject, I may be excused for mentioning that in this same section within a radius of one hundred miles have been made many other wonderful agricultural records, such as four bales of cotton per acre; 182 bushels of oats per acre, and 820 bushels of Irish potatoes on one acre.

Oats, followed by peas the same year, is also a humus-making crop, and the Florida velvet bean and the soy bean are very valuable for hay and grazing, besides being wonderful soil improvers.

The most effective method of soil improvement, however, is found in the employment of cover crops which are sown between the rows of the cultivated crops in the early fall. These cover crops take up the unused residue of the fertilizer applied to the preceding crop and also use whatever plant food becomes available during the winter. They keep the land from washing and supply, when plowed under in the spring, valuable fertilizer material and humus to the succeeding crop. The clovers and vetches are most generally employed as cover crops, but the most valuable plant for this purpose which I have tested is a new variety of rye recently imported by the government from the province of Abruzzi in Italy which makes a larger growth during the winter than any other cover crop I am familiar with.

The average yield of lint cotton in the southern states is only about 200 pounds per acre. This figure proves conclusively that the bulk of the crop is raised under poor conditions, for under moderately good conditions, the yields are from 400 to 600 pounds. I have observed for years that cottons produced under poor conditions as to soil, fertility and culture, are invariably weaker and shorter staple than the same varieties produced under more favorable circumstances. This difference will not run less than one-sixteenth inch in length, and the strength, though not determined, is markedly inferior. So I think it is safe to say that the general adoption of a proper rotation with cover crops will increase the average length of the cotton fiber one-sixteenth inch, besides greatly increasing its strength. The general employment of these improved methods will not cause an increase in the crop, for a proper rotation requires that not more than one-half the area of our farms shall be in cotton, whereas now, at least three-fourths and often a much larger proportion is so employed.

A number of our southern experiment stations carry on cotton variety tests each year and among other data from these tests is set down the length of staple and the number of bolls per pound of the different varieties. The farmers of our section pay no attention whatever to the length of fiber of short staple varieties of cotton, as they are unable to realize any more from a variety producing one and one-sixteenth inches staple than from one producing only five-eighths inch.

The whole system of purchasing short staple cotton from the farmer is wrong and uneconomic. If a fair difference in price were made by the buyer between each length of cotton, paying the man with one inch cotton more than the one with three-fourths inch staple, it would quickly improve the staple of the cotton crop. Many of the most productive varieties will produce at least one inch staple under normal conditions and farmers would quickly abandon the shorter staple sorts if it were made to their interest to do so.

The farmer is, however, beginning to appreciate the importance of size of boll in the economy of his operations. There are a number of short staple varieties of high production which run from 50 to 60 bolls to the pound, the average of all varieties being around 75, while in many varieties it requires at least 100 bolls to weigh one pound. The picker can harvest a much greater quantity per day of a large bolled than of a small bolled cotton, thus a large bolled crop is more quickly gathered, the grade is higher and the labor is available much earlier in the season for other necessary farm tasks. It is also a fact that most of the larger bolled cottons have longer staple than the small bolled sorts and the general adoption of large bolled cottons will mean an improvement in the length and grade of the crop, and will thus benefit the spinner.

We now come to the most effective means of improving the quality of the cotton crop—plant breeding. The plant breeder has done wonders in increasing the yield and good qualities of many of our most important crops. His work has meant millions of dollars in additional profit to the great corn and wheat states. The beet sugar industry is absolutely dependent upon his labors. Many of our finest fruits and vegetables have been created or greatly improved by him within a generation. Our splendid Sea Island cotton, the finest in the world, is the result of years of patient labor by a few intelligent breeders.

Until a few years ago, however, little work worthy of the name of plant breeding was done upon upland cotton and we are only beginning to see the results of the pioneer work of this kind upon our great staple crop. We have in the South hundreds or possibly thousands of so-called varieties of cotton,—many of which are indistinguishable from each other and nearly all of which are composed of a great number of different types of plants.

Dr. H. J. Webber was the first man I know of who realized that the most prolific field for the improvement of upland cotton lay in the segregation of the many types, the testing of each separately and the propagation of those which proved themselves of highest quality and yielding capacity. Dr. Webber's work, beginning about 1900, was done under the auspices of the United States Department of Agriculture with which he was then connected, and continued until he severed his connecton with government work, about eight years later. In that brief period he produced two excellent varieties of upland staple cotton by selection and pedigree breeding from short staple sorts. These cottons, the Columbia and Keenan, are now planted over wide areas in many parts of the South and have been frequently proved to be fully as productive as the average of the short varieties.

My own plant breeding work at Hartsville dates from my acquaintance with Dr. Webber and my observation of his work. Beginning in a small way about ten years ago I have rapidly expanded the plant breeding work at Hartsville until now it requires several trained experts and over twenty acres in breeding plots to carry on the work. Cotton, corn, oats, rye, peas, beans, sorghum and melons are all receiving our attention. We work strictly by the plant to row method and any variety which we put out can be traced back through our records to the original plant which produced it and often through as many as nine generations of individuals. Such work is known as pedigree breeding and it is (just as in animal breeding) the only sure method of producing varieties of desired characters and keeping them true to type.

When I began breeding cotton I observed that the cotton plant presented a great diversity of characters and my selections were made with a view of combining the greatest number of those which were desirable and propagating them in a single uniform variety. The most important of these characters are yielding capacity, length, strength and uniformity of lint, and size of boll. It is no trouble to find plenty of one and one-eighth inches to one and three-sixteenths inches plants in almost any field of short staple cotton and we quickly discovered that the longest linted and largest bolled of these were as apt as not to be the heaviest yielders.

After about seven years of breeding I began to distribute the seed of my first staple variety around Hartsville. Our farmers were ignorant as to the proper methods of raising and handling this crop. A campaign of education was, therefore, begun at that time and has been continued ever since. The writer several times every year mails out thousands of circulars on some subject of interest to the staple planter. He also delivers frequent lectures at Farmers' Institutes and before agricultural societies in which the salient points for success in the staple cotton industry are pointed out.

The distribution of seed of pedigreed varieties of staple cotton which are uniform in character and higher in production than most of the short staple varieties, and the campaign which has at the same time been carried on to instruct the farmers how to handle these cottons, has resulted in the production in the territory contiguous to Hartsville, of a character of cotton which for uniformity and strength of staple, is not surpassed, if equalled, by that produced in any other quarter of the United States. This is attested by the eminent satisfaction which well graded shipments from our territory have given ever since the cotton was introduced. Many mills now recognize our new cottons as distinct from and much superior to the old weak wasty staples which were formerly the only kind raised in the Carolina uplands. It required several years of persistent effort, however, to induce many of the staple mills in the Carolinas to give the new varieties a trial, and if it had not been for the kind cooperation of Lewis W. Parker and a few others, the task of introducing these new cottons would have been almost insuperable.

The mills and the farmers have not yet fully realized the significance of the fact that the Columbia and Keenan and my Hartsville and Webber cottons actually make in our section greater average yields of lint cotton per acre than short cotton. (This fact, repeatedly proved in my own variety tests, will not be disputed by anyone who

is familiar with the results of recent experiments at the Raleigh and Clemson experiment stations or who has talked to any of the farmers in our section that have had several years' experience with these varieties.) It means that the planting of these varieties and other long staples bred in the same way from short staple sorts and possessing all the superior characters of short cotton, will expand as rapidly as the demand for them develops and the knowledge of the essentials of success in this industry reaches the farmers.

I have thought it well to repeatedly warn the farmers that the staple cottons raised in our section could not be expected to retain their superior qualities unless proper care can be taken to maintain the purity and uniformity of these varieties and to handle them with intelligent care at every point until the cotton is actually sold.

The new upland staple cotton industry of South Carolina is distinctly the product of plant breeding, and I do not expect it to succeed permanently in zones where the influence of the plant breeder is not felt. I have noticed, in fact, that much of the cotton produced from seed of the excellent varieties bred by Dr. Webber and distributed by the government six or seven years ago, has already lost some of its excellent character and does not compare with that produced from seed of later pedigreed strains. This is, of course, because most of the farmers who received these seed have done nothing to keep them from reverting to the original type. We are attempting in South Carolina to do for the state at large through our recently organized Plant Breeders' Association, of which this speaker is president, the same sort of educational work which has already been done in the vicinity of Hartsville, and it is hoped that within a few years our farmers generally may be brought to understand the essential principles of this new industry.

Meanwhile, however, we are going to have a considerable amount of very poor staple cotton from the eastern part of the belt and buyers and mills can very materially aid our Plant Breeders' Association in the propaganda for better staples if they will discriminate rigidly against cotton of poor character or that which has been carelessly or roughly handled. I want, in fact, to pointedly warn those mills who have received satisfactory shipments of the new staples not to presume that they can now get from any and everybody in the Carolinas staple cottons of the same excellence, for if they buy thus indiscriminately they will certainly be grievously disappointed.

One of the most surprising discoveries made by me in buying cotton of varieties of my own breeding and introduction was the tremendous fluctuations in length and strength caused by different conditions of moisture, soil and culture. I have occasionally observed differences of one-eighth of an inch in length in the staple from different fields of the same kind of cotton on the same farm. In 1911 and 1912 the maximum variation of my own pedigreed varieties was about one-eighth of an inch. I find that invariably the shortest stapled bales of a given variety are the weakest and poorest in character and were raised under the worst conditions.

If those who are earnestly endeavoring to make a permanent success of this industry receive the proper encouragement from the mills, there is no question that it will, within a few years, be placed on a permanent foundation to the great benefit of both the planter and the mill. A thorough understanding of its problems and difficulties, as well as of its merits and advantages, will, however, make its success more prompt and certain. The hundred thousand or more bales of staples afforded by a small area in South Carolina during the past two years has undoubtedly been largely instrumental in averting an absolute famine of 1 1/8 to 1 5/16-inch cotton which would have resulted from the curtailment of the staple crop in boll weevil territories if this new supply had not been available.

I believe that we shall see during the next decade a notable increase in the yield per acre, the length of staple and the spinning quality of the American cotton crop due to the general adoption of the improved type of farming which I have spoken of as "the new agriculture," and I believe that cotton spinners can and ought to have a share in this great movement to advance southern agriculture by cooperating with its leaders in every possible way.

Mr. Coker's paper was one of the most interesting read at the meeting, and held the close attention of his hearers from start to finish. It was followed by a series of questions from several in the audience, which Mr. Coker answered in a way that showed his familiarity with the question.

The report of the committee on conditioning cotton yarn and cloth, in the absence of the chairman, Arthur T. Bradlee, was read by title.

REPORT OF COMMITTEE ON CONDITIONING OF COTTON YARN AND CLOTH

By ARTHUR T. BRADLEE, Chairman

Boston, Mass., March 21, 1913.

Edwin Farnham Greene, Esq., President The National Association of Cotton Manufacturers, Boston, Mass.

Dear Sir:—Your committee, appointed to investigate and report upon the question of the establishment of a conditioning house and on the standardizing of tests and specifications for cotton yarns, begs to report as follows:

Until recently practically nothing has been done among the cotton trade of this country on this question, while practically all the foreign nations have their conditioning houses and rules of trade to which their standard sale notes conform. In this country certain individuals of our association and outside have done considerable personal work and investigation along the general lines which are dealt with by the so-called conditioning houses. The increased competition of present times and the adoption of the so-called system methods, with their various forms of specifications,, make it urgently necessary that the trade

be educated as to what can and what cannot be expected in the degree of perfection of textile products:

First, so that such specifications may be made fair to both the buyer and the seller, and

Second, to establish uniform methods of testing to ascertain whether the specifications have been complied with and to offer a recognized headquarters where impartial tests can be made in accordance with the methods agreed upon.

Within the past few years the United States Government at the Bureau of Standards of the

ARTHUR T. BRADLEE.

Department of Comerce and Labor at Washington have made a large number of tests on cotton yarns and fabrics with the idea of establishing their own standards and specifications on which to make government purchases. It seemed very essential that the United States Government should adopt no standard that would be inimical to the manufacturer and that the government should, if possible, adopt no standard that did not have the approval of our association. In fact, it seemed wise that we should adopt standards and methods of testing and get their acquiescence to those methods so that their standards and those adopted by the manufacturers should be identical in every way. Dr. S. W. Stratton, in charge of the work of the United States Government, is entirely in accord with this idea and is heartily in sympathy with us in this movement.

At the outset of your committee's work they were provided with the results of tests made by the government, but we had no real information as regards the general business working of the large foreign conditioning houses, of which the Manchester Testing House of Manchester, Eng., probably stands at the head as regards cotton yarn testing, while the Bradford Conditioning House of Bradford, Eng., holds a similar position as regards woolen and worsted testing.

Finding that the United States Government intended to send a representative from the Bureau of Standards to England to investigate the work being done at some of these large testing houses, we arranged with that representative to make certain additional investigations for our committee, largely along the lines of certain questions which we were interested in, but which the government did not intend to investigate.

Walter S. Lewis, the representative of the government, was in England in September and upon his return has made us a report both upon the Manchester Testing House and the Bradford Conditioning House.

In the interim your committee has received a letter from the board of government of the United States Conditioning and Testing Company, 340 Hudson St., New York, N. Y., inviting us to join with them and adopt their conditioning house as the official conditioning house of our association. The United States Conditioning and Testing Company, while started originally as a more or less private venture, is today a cooperative body representing the silk industry of the United States. Its shares are, as a rule, held in small amounts and distributed among practically all the different silk firms of the United States. It has had and has today on its board of directors some of the most representative silk manufacturers of this country. A very large percentage of the silk business now passes through this conditioning house and is bought and sold on its conditioning reports. We file herewith their handbook which will give you some idea of the work they are doing. Exhibit "D."

With the idea of enlarging their work, they added to their organization on the first day of January last, D. E. Douty as manager of the conditioning house. Mr. Douty has had entire charge of the work at Washington— under the direction of Dr. S. W. Stratton, director of the Bureau of Standards, and is intimately in touch with every detail of the government work. Mr. Douty has followed up the suggestion made by the board of directors in extending to our association the invitation to join with them and make this conditioning house the official conditioning house of our association.

You will note from his statement that in 1911, the laboratories made 34,535 tests and in 1912, 40,958. While this company have been confining their attention practically entirely to silk they are fitted up with apparatus for the testing of cotton yarns and are willing to add whatever additional apparatus is necessary. We understand they also are willing to fit up with the necessary machinery for the testing of cotton cloth. They stand ready to make practically any arrangement the Association may desire as regards membership on their board, executive committee, etc. The conditioning house is also in a position to make tests on soaps, oils, sizing mixtures, dyestuffs, etc. In fact, on any matters of this sort in which the textile trade are or will be interested. While run with no idea of making money for its stockholders, this conditioning house, as stated by Mr. Douty, is now on a paying basis.

As to the foreign testing houses, you will notice from their reports that they are both more than paying their way and that they are being used more and more each year; the Manchester Testing House making last year some 80,000 tests and the

Bradford Conditioning House about 240,000. The whole question of the conditioning of yarn and the testing of yarn and fabric under standard condition is becoming more and more urgent in all countries and your committee have received numerous letters from all classes of trade for information and advice along this line.

In considering the question as to the advisability of our association adopting the laboratories of the United States Conditioning and Testing Company as the official laboratories of the Association, we have visited their laboratories and have also communicated with Dr. Stratton, director of the Bureau of Standards, to ascertain whether such action on our part would meet with the approval of the United States Government and with their cooperation. We have a letter from Dr. Stratton heartily approving of such a move and assuring us of their cooperation.

After examining the whole question it has seemed to your committee best that we should recommend cooperation with the silk manufacturers and adopt their conditioning house with such control and representation as may seem advisable. With the adoption of that testing house by our association, it would be their endeavor to get this same conditioning house adopted as the conditioning house of the American Cotton Manufacturers' Association, the Knit Goods Association and other textile associations of similar nature, so that we would have one headquarters and a uniform method of testing under uniform conditions. With the adoption of the conditioning house we can then adopt such standard contract rules as may seem advisable. The United States Conditioning and Testing Company have adopted a regular contract for silk which is shown in the book of their association.

The yarn contract rules adopted by the Manchester Yarn Contract Conference and approved by representatives of the Manchester Chamber of Commerce, the Oldham Chamber of Commerce, the Rochdale Chamber of Commerce, the Federation of Master Cotton Spinners' Association and the United Cotton Manufacturers' Association are embodied in notes of the Handbook of the Manchester Chamber of Commerce, page 91.

With some minor exceptions it would seem that our association and the other associations of this country could adopt practically these same rules, which have stood the test of some sixteen or seventeen years in England and which represent what has proved to be a fair basis for both the buyer and the seller. The adoption of these rules with the tribunal of arbitration referred to in Mr. Lewis' report have, in a large way, done away with lawsuits in the English textile trade and have enabled disputes to be settled promptly and satisfactorily without recourse to law. Eventually this association should offer a similar tribunal.

The first step toward the adoption of such rules is the adoption of an official testing house of the association where tests can be made under certain definite lines both by the manufacturers themselves and by the purchasers of their goods.

After looking into the whole matter, therefore, we recommend that prompt action be taken for officially adopting this United States Conditioning and Testing Company as the present official testing house of our association. The adoption of this testing house by our association will go a long way toward its adoption by the other associations and the general standardizing of the whole cotton industry by uniform methods, under uniform rules and along uniform lines.

Respectfully submitted,

Arthur T. Bradlee,
Chairman for the Committee.

Walter S. Lewis, assistant physicist of the Bureau of Standards, Washington, read a paper on

HUMIDITY EFFECTS AND TEXTILE TESTING

By WALTER S. LEWIS, Assistant Physicist Bureau of Standards, Washington, D. C.

The demand and necessity for uniform and accurate standards for testing became very acute a few years ago and at that time the National Bureau of Standards became interested in the testing of textile materials. Since that time the bureau has aimed to meet this need by the selection of standard materials, standard methods of testing, and development of standard specifications. The bureau also makes available to the manufacturer, its facilities, by standardizing the instruments by which he tests his product and upon his request the product itself may be tested. Technical problems are also referred to the bureau, which aims to serve as a clearing house for technical information upon subjects within its fields.

The study of the physical and chemical properties of textile material by means of laboratory tests has been carried on in this country in a more or less desultory fashion for a great many years. Quite recently, however, the development of more systematic and greatly-improved methods of testing, with a consequent augmented accumulation of data, has given the results obtained a much more practical significance than in former years.

In England, France, Germany, Austria, Italy, and Japan advanced methods of testing have been utilized with remarkable results. The present general interest in the necessity for better methods and standardization of tests has resulted in the establishment of testing apparatus in textile institutions, public testing laboratories, stores, and mills. A large number of samples are submitted to the Bureau of Standards for investigation not only from the Government departments but by manufacturers and dealers. The fact that this work is rapidly increasing is good evidence of the value of the information received. The bureau will gladly cooperate with institutions, investigators, manufacturers, and consumers, not only in the execution of scientific testing and standardization, but also in furnishing information in its possession concerning methods of testing and the interpretation of results. It will be pleased, also, to help in the design and construction of special apparatus. The scope of testing which the bureau is now prepared to undertake is summarized below.

1. Determinations upon raw and unspun fibers:

a. Identity of fiber.

b. Approximate length.
c. Moisture content and "regain".
d. Quantity of oil, grease, and foreign substances contained.
e. Percentage loss in scouring raw wool.

2. Determinations upon yarn, thread and twine:
a. Length.
b. Tensile strength and elasticity.
c. Count or number.
d. Twist.
e. Percentage of loading, sizing, and coloring material.
f. Percentage fiber composition.

3. Determinations upon fabrics:
a. Weight.
b. Tensile strength and elongation.

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c. Percentage fiber composition.
d. Thread count.
e. Yarn number or size.
f. Folding endurance.
g. Action of light on colors.

The humidity of the atmosphere affects textiles in general, and illustrations of its influence should be given.

All vegetable and animal fibers contain in their normal state, a certain proportion of moisture, which varies not only with the nature of the fiber but also with the moisture or humidity in the surrounding atmosphere. The result is that the same merchandise frequently shows considerable difference in weight, according to the place in which the weighing is made.

This hygroscopic property of textiles has led to abuses which have caused numerous trade disputes and in some instances have been most injurious to commerce.

The seller of merchandise was not always satisfied with fair profits, and instead of storing the goods in a normal atmosphere, he was tempted to make an easy profit by storing it in damp places, such as cellars or ground floors, which he might even have sprinkled beforehand.

In the cotton industry little or no standardization as to methods of testing has been undertaken, and although tests are performed the industry is dependent very largely upon the units and methods as carried out by certain manufacturers and individuals. In a more or less desultory fashion the study of the physical and chemical properties of textile material by means of laboratory tests has been carried on in this country for a number of years. The recent development of more systematic augmented accumulation of data, has given the results obtained a much more practical significance than in former years.

The demand for information from the Government departments and those engaged in the manufacture, distribution, and use of textiles in regard to better methods and standardization of tests has resulted in the establishment recently of testing apparatus in textile institutions, public testing laboratories, stores and mills. Since the dealers and manufacturers of cotton yarn were in great need of more definite knowledge and generously supplied the necessary material, an investigation upon the physical and chemical properties of cotton yarn was undertaken.

Only a limited number of yarns has thus been investigated but it is believed that the results already attained will furnish information of value to manufacturers and consumers. The object of the work was to show the desirability of improving the technical regulations of the trade and the necessity of better specifications, and that if a thorough study of this subject is published some of the misunderstandings now existing may be avoided, at the same time uniformity may be promoted in yarn deliveries and methods of testing.

The samples of yarns employed in this investigation were secured from members of The National Association of Cotton Manufacturers, through the courtesy of Arthur T. Bradlee, Chairman of Committee on Conditioning of Cotton Yarns and Cloths. The yarn sizes used were of singles, 25 to 100 inclusive; and of two-ply, the range was from 14 to 100 inclusive.

Some of the results obtained upon cotton yarns under different atmospheric conditions are as follows:

1. With small changes in the relative humidity of the atmosphere, such as, from 45 per cent. to 85 per cent., the size of a 36/1 yarn may vary as much as two counts, and an 8/1 yarn over four counts, or in other words, 5.5 per cent. in each case. The two-ply yarns are not as susceptible to changes due to humidity in the atmosphere, although they vary from one-half a count on 10/2 yarn to almost five counts on 96/2 yarn with an average of 4.5 per cent. on all sizes. Greater differences in relative humidity are common in this country than those used in this work, and if the

extremes were employed much greater variation in yarn count would have been obtained.

2. Under the conditions outlined in No. 1, the yardage in one-ply yarns singles can be increased or decreased from 1,700 to 3,700 yards per pound, or 5.5 per cent., according to size of the yarn. The two-ply yarns can be changed in yardage by the humidity of the atmosphere, the difference in length ranging between 250 to 2,000 yards per pound, or about 4.5 per cent.

3. The tensile strength of cotton yarn increases with an increase of moisture up to 85 per cent. relative humidity (the highest point reached in this investigation). The one-ply yarns singles are influenced more than two-ply yarns. Calculating from 55 per cent. to 85 per cent. relative humidities, the singles increase 17 per cent. and the two-ply yarns increase 11 per cent. in tensile strength. Further tests were made with the two-ply yarns and the results show that the strength can be increased more than 16 per cent. between a relative atmospheric humidity of 85 per cent. and a relative atmospheric humidity of 45 per cent.

The count, yardage, strength, and elongation of cotton yarns is directly influenced by the amount of moisture present in them. In view of this fact it is not only advisable but necessary, that some standard conditions of humidity and temperature should be adopted and recognized in the testing of fibers, twines, yarns, and fabrics.

Many instances have occurred during the past year in which large consignments of yarns and fabric were rejected for the reason that the deliveries did not meet the requirements of tests as outlined in the contract specifications. In several cases the manufacturers discovered they had made their tests under abnormal conditions of the atmosphere, so that fictitious results were thus recorded.

In this country there are no recognized standard atmospheric condition under which tests should be made. From recent experiments and work upon the subject, a suitable atmosphere and probably very near the normal conditions is one of 65 per cent. relative humidity at a temperature of 70° Fahrenheit.

The term relative humidity means the percentage ratio of moisture present in the air at a certain temperature, as compared with the amount of moisture that the air would contain at saturation if at the same temperature. The 65 per cent. relative humidity above mentioned, therefore, indicates a constant amount of moisture in the air, provided the temperature is kept constant, but the amount of moisture for 65 per cent. relative humidity increases with increase of temperature.

Without knowledge of the temperature and humidity of the atmosphere at the time of test unreliable results may be obtained. If the above condition cannot be regulated in the room or closet in which the tests are performed, then the temperature and humidity should be ascertained and if possible a correction made to give results that would be obtained under standard atmospheric conditions.

The wool fiber in its various forms is materially affected by moisture and atmospheric changes, and I shall give you some illustrations of actual observations:

It is well known that raw wool is an article relatively difficult to standardize, leading itself readily to deception. Its weight varies according to the climatic conditions. In rainy weather wool will increase in weight as much as 6 1/2 per cent. over its weight in ordinary dry weather. Because of its power to absorb moisture, its weight can be still further increased as much as 15 per cent. When buying raw wool, it therefore becomes important to know the amount of moisture contained in a given lot, as an excess of a few per cent. in the normal amount of moisture will sometimes mean a loss of several thousand dollars to the buyer. The humidity cannot be quantitatively determined by mere physical examination, even though differences can be noticed in touch. Raw wool contains varying per centages of moisture, according to its grease and dirt contents, and the humidity often exceeds the average amount for this reason.

Laboratory tests were made upon several kinds of foreign and domestic wools used extensively by manufacturers in this country. These were kept in an atmosphere of 65 per cent. relative humidity and a temperature of 70° Fahrenheit, for eight hours and carefully weighed. Each was then heated separately in a conditioning oven at 120° centigrade (248° Fahrenheit) until a constant weight was obtained. The following percentages of moisture found in each case were carefully calculated from the bone-dry weight:

Kind of Wool	Per ct. moisture
1/4 blood	8.5
1/2 blood	8.5
Lincoln Ewe	8.6
Fine Delaine	8.7
Merino Ewe	8.8
Australian 80/s	9.6
3/8 blood	10.0
New South Wales 41/s	10.5
Australian 70/s	11.5
Half Breed Ewe	11.7
Australian Light Condition	12.1
Romney Hogget	12.3
Corridale Hogget	12.4
Crossbred Hogget	13.2

The quantity of moisture in five different kinds of commercially scoured wool was found to be 13.4 per cent. Below is given a table showing the regain upon 11 kinds of commercial wool tops viz: 3/8 Territory, 3/8 Territory, 3/8 Territory, Australian 70/s, Australian 70/s, Northern Cal., Fine Ohio and Montana, Lincoln Hogs, 3/8 blood, 1/2 blood, 1/4 blood.

The temperatures at the different relative humidities was constant at 70° Fahrenheit.

Regain at various percentage humidities:

Per cent.	45	55	65	75	85
Average	13.33	14.51	15.37	16.38	18.92

The above figures are the averages only, of a long series of tests.

In reply to questions from the audience Mr. Lewis stated that the textile trade in

foreign countries had adopted standard conditions of temperature and humidity for textile tests, and was far ahead of the United States in this and other matters in connection with conditioning. At this point in the proceedings President Greene read the following resolutions on the tariff, as approved by the committee:

Whereas, the Members of The National Association of Cotton Manufacturers in annual convention today view with such profound apprehension the rates on cotton manufactures proposed in the new Underwood Tariff Bill,

Resolved, that the regular order of business be suspended and the following protest be unanimously adopted that the American people and its representatives in Congress shall understand and appreciate the unexpected and unfortunate disturbance threatening one of the greatest American Industries—unexpected, for the platform of the Democratic Party introducing this measure distinctly and unequivocally pledged itself against anything so drastic; and, misleading, for the bill is offered to the American people as a competitive measure and not as one injurious to American Industry and to American Labor.

Resolved, that it is the sincere and firm conviction of the Members of this Association that the proposed new rates are not only inadequate in many cases as a basis upon which to revise the cotton schedule, but that the classifications are illogical and impractical and surely represent, to say the least, a grave oversight, or lack of appreciation, of the manufacturing expense differentiating one class of product from another. It is inconceivable that yarns advanced in manufacture by many difficult and expensive processes should not be entitled to higher rates than single yarns in the gray; and it is even more incomprehensible that the most elaborate and complicated weaves, dyed, bleached or finished, should have only 2 1/2 per cent. higher rates than for plain gray cloths of corresponding numbers of yarns.

Resolved further that the drastic reductions in Cotton Manufactures and the raising of the rates upon materials entering into their manufacture such as indigo and other dyestuffs, is contradictory and imposes an unnecessary expense upon both manufacturer and consumer.

Resolved further that the administrative feature of the bill which provides that if any part of the schedule does not result in importations to the extent of 5 per cent., may bring about a further reduction of rate should carry with it a corresponding provision requiring the raising of rates on such portions where importations exceed that amount.

Resolved further that this Association records itself as unalterably opposed to ad valorem rates as against specific duties which protect when protection is most needed, which are definite and easy of administration, which offer the only sure method yet devised by any country to prevent undervaluations and fraudulent importations, and which have not only stood the test of fifty years in our customs service, but are based upon the actual description of goods as bought and sold in the markets of the world every day in the year.

Resolved, that as spokesmen for the Cotton Industry in which is directly concerned the welfare and livelihood of over two million people, not local but distributed over a large area of the United States, the Members of The National Association of Cotton Manufacturers do hereby voice their most emphatic protest against the threatened crippling of this industry in the name of revenue and price regulation when neither can possibly be regarded as the essential features of the bill in its present form, and when there is no need whatsoever for monopolistic curbing, nothing even remotely approaching monopoly existing in this industry; and, at a time when it has been suffering for the past three or four years a period of unexampled depression on account of over production with attendant domestic competition in its bitterest and most relentless form.

We urge upon Congress such modification of the bill as will bring it, at least, within the expressed and declared platform upon which the Political Party in power was elected and charged with the responsibility of this Tariff revision.

Be it further Resolved: That a copy of these resolutions be sent to the President, the Chairman of the Committee on Ways and Means of the House of Representatives, the Chairman of the Committee on Finance of the Senate, and to all individual Senators and Representatives in Congress.

It was moved and seconded that the resolution be adopted, which was done by a unanimous vote.

The papers on tare on cotton in the absence of the authors were read by title:

TARE ON COTTON

By OSCAR ELSAS, President Fulton Bag and Cotton Mills, Atlanta, Ga.

The subject of the Tare on Cotton is one of vital importance to all users of cotton.

My experience with the sellers of cotton has led me to believe that very few consumers pay sufficient attention to this item, the result being that each and every one is paying for bagging instead of cotton.

After the correct system is once started, it is very simple to carry out. For your information I attach herewith sample copies which illustrate our system:

Exhibit 1. Form of Cotton Contract.
Exhibit 2. Loose Leaf Cotton Record.
Exhibit 3. Form used for Reporting to Shipper when chargeable with excess tare.
Exhibit 4. Form of Cotton Tag.

The first point that impresses the writer is the varied qualities and styles of tare, especially bagging that is used on our American cottons. For instance, in the state of Georgia, from which our mill has received its best and cleanest packages, we have found:

About 60 per cent. new bagging and ties.
About 30 per cent. second hand bagging and ties in all states of repair.
About 10 per cent. in sugar bagging and second hand ties.

In the states of Mississippi, Louisiana and Alabama, we believe the percentage of cotton that is shipped in sugar bagging will amount to fully 80 per cent., with the balance divided equally between new and second hand bagging. Further west, we find that the percentage of sugar bagging does not run as high.

On all compressed cotton we have found that the American method of sampling and shipping calls for so much patching, and in some cases repatching, that the largest portion of our excess tare comes from points from which we have received compressed cotton.

Through personal inspection at various compresses, by our cotton men, we find that excess tare comes from one or more of the three following causes:

First. A shipper, in shipping 100 bales, delivers to the compress a given amount of bagging for patching, which if properly applied, would figure out approximately the amount of tare allowed. However in compressing, due to lack of proper supervision, or carelessness, the negro laborers, instead of applying one patch above or below, seize two or more to put on one side, and a like quantity on the other side of the bale, in order to dispose of the patching as soon as possible, and simplify their work at the press.

Second. It is the custom of a great many shippers to put on excess patching to the amount of the franchise allowed on compressed cotton, and they further frequently add two to seven pounds per bale on cotton which is to be a boat shipment, figuring on the percentage of moisture to be taken up by the cotton en route.

Third. The absolutely necessary extra patching, which is sometimes called for,—though not as frequently as one might suppose—because of the unsystematic and wasteful method of sampling in vogue in this country, which permits of cutting and slashing a bale all over both sides.

Since the mills, in the last few years, have taken up the question of excess tare a trifle more vigorously than was formerly the practice, we have noticed that some few of the more progressive cotton shippers make a practice of having their own inspector at the compress to oversee the process of opening, patching, and compressing. This tends to do away with the excess tare mentioned, first.

The second is a much harder practice to overcome, the writer sees no way for those who receive their cotton by water to meet the conditions except by a system, vigorously applied, of making reclamation for all excess tare on individual bales, the right to do which can only be obtaned by an individual bale tare clause, such as is embodied in our contract.

The system of opening and weighing tare on ten bales selected at random from a shipment of one hundred bales, does not, in the writer's opinion, properly meet the condition met with in our second point. It is just as possible that the ten bales selected may be either the heaviest or the lightest in the shipment; or, as is the case in our plant, it is frequently a physical impossibility for the mill receiving the cotton to handle the tare situation by this method. In the season of 1912 this company received approximately two hundred and forty different shipments, ranging in number of bales from ten to two hundred. There were received as high as forty cars in one day, covering, in this instance, parts of nineteen different shipments. You will readily recognize the fact that no mill has the labor or the facilities to handle the cotton which would be opened under the above provision, even though all the cotton opened was of the quality (grade and staple) being used at that time by the mill.

The third condition the writer sees no means of overcoming except by a vigorous, well-directed effort on the part of the mill men and brokers to the standardization of a method of packing and sampling.

For the season of 1911 and 1912, our company made reclamation on a total of seven firms, covering aggregate shipments of 15,364 bales, out of which 438 bales were found to carry excess tare, amounting to 2,174 pounds, which is an average of nearly five pounds to the bale. For this amount of tare we collected $247.27. Our system of keeping record on tare shows that out of the above 438 bales, only forty bales of flat cotton carried excess tare, and in each case this was caused by either second hand bagging, or, what is known in the country districts as reworked bagging. The remaining 398 bales were all compressed cotton. Our heaviest excess came from Alabama points, averaging a few points over eight pounds to the bale. Our lightest excess came from Mississippi points, where it averaged a fraction over four pounds to the bale.

In this connection, the writer believes it of extreme interest to state that in the season of 1910 and 1911 we received large quantities of cotton from Memphis on which we had made a great many tare reclamations. While some of these were disputed, we insisted on a proper and prompt settlement, with the result that in the season of 1911 and 1912 it is very noticeable that we have not had a single pound of excess tare from this point, showing conclusively to our mind, that a proper pushing of the excess tare question by the consumer, will bring about satisfactory results.

In making charges for excess tare we never make a charge unless the excess is at least two pounds over the maximum allowed by contract. In all instances where the excess is only one pound, no charge is made, with the fact in mind that a possible shrinkage by moisture, or difference in scales, might make this small amount questionable; therefore we make practice of allowing one pound more than the maximum provided by contract as a—for want of a better name—factor of safety. Under this heading we have had approximately 1,500 pounds excess for which we have made no reclamation, yet we believe that this is the best way to handle the matter, from the fact that when a shipper disputes your weights, you can always show him tare that is two or more pounds in excess.

In order that you may properly understand why our company can stand so solidly on their tare claims, I shall outline, briefly, the method by which the excess is determined. In the first place, the maximum amount of excess is provided for in every contract, and provides for all tare claims being legal for a period of twelve months from date of receipt of cotton.

When the cotton is opened in the opening room, the tare is stripped from the bale, carefully cleaned of adhering cotton,—the bagging and ties being weighed separately, in order to determine which part of the tare, if any, carried excess. If it is found to come within the provisions of the contract, the tare immediately goes to the baling pile. If found in excess, one of the sworn weighers is notified, who, in company with the opening room man, carefully rolls the bagging and ties, with all the shipper's identification marks,—such as tags or brands,—carefully placed in the roll, and weighs same with care. On this roll he places a tag, giving date, shipper's mark and number, our tag number and the weight of the tare at the time of opening, which same information is placed on our Cotton Record tag and sent to our office in the regular way. The tare is kept in a place provided in our warehouse for such purpose, and is held until the shipper has been notified of the excess, which we do monthly, and the claim paid for; or, if disputed, we have the tare on hand for the shipper's inspection,—the identity of which can be sworn to by our sworn weigher and the opening room man.

The charge for excess tare is made from the record on the tag sent to the office, which is identical with the record on the tag attached to the bale. This, to our minds, makes a system that it is impossible for a shipper to question, and is much more accurate and satisfactory to the buyer than the averaging of tare on a lot of ten bales, as mentioned above.

Another feature of the tare question, which is of deep interest to consumers, is the question of country damage, as increased or decreased by proper covering. We find, in our experience, that cotton covered with regular cotton bagging, in good condition, is much less subject to damage from having been wet, than that covered by any other covering. We have further found that in all cases of heavy damage, that the cotton has invariably been covered with a heavy, closely woven covering, of which sugar bagging is the most common. As you are all aware, a properly packed bale is partially covered on the ends. When compressed it is completely covered. With regular bagging this covering is frequently several thicknesses, but the fact that the covering is of a very open weave, permits of a freer passage of air and a much quicker drying out of the moisture. Sugar cloth coverings, most of which is second hand, is a much closer woven fabric of a heavy construction, and after becoming wet, is practically airtight. The writer has seen many an instance of where cotton has been wet after receiving, put in the warehouse and carried from there to the opening room several months after the receipt of the cotton. On being opened, we have examined some of these bales, and found moisture to such extent that water could be wrung from the cotton held in one's hands. This condition applies particularly to the season of 1911 and 1912. In the cool months no great damage was effected, but in the warm months the damage became quite a problem, and when we found a bale containing 121 pounds of cotton, damaged to such an extent as to be worthless, we concluded to move every bale of cotton in our warehouses, in a great many instances turned them end to end, and examined every bale.

We can't see the necessity for excess tare. We believe that a proper interest by the consumer in the question of excess tare, a careful system of tare reclamations, an individual bale tare clause in consumers' purchasing contracts, and a vigorous system of reclamations in all cases of excess tare, would practically abolish this pernicious system of packing, which is a dead loss to the consumer in value paid for cotton, excess freight, extra cost of handling in the mill, cost of guarding against the same, and extra cost in the office because of unnecessary clerical work. We further believe that vigorous efforts to improve the quality of covering used on cotton would eliminate, to a large extent, the question of excess tare. We believe that a proper representation of these facts to reliable shippers would induce all shippers to put their own inspectors at compress points to inspect the handling of their own cotton, as is now being done by some two or three shippers.

Any member who may be interested in this subject and desires further information, same will be gladly furnished.

The paper on cotton growing in the Anglo-Egyptian Sudan, by Arno Schmidt, Manchester, Eng., was read by title.

At the morning session on April 24 the following papers were read:

POWER MATTERS IN TEXTILE MILLS

By F. W. DEAN, 83 State St., Boston, Mass.

So much is written nowadays concerning power matters in all kinds of mills, that considerable courage is required to undertake a paper upon power subjects is relation to textile mills. I must however, place some of the responsibility for my undertaking it upon the energy of your Secretary.

You have had presented to you by other engineers installation costs, and I shall therefore say but little on this subject, confining myself more to general matters.

STEAM TURBINES VERSUS RECIPROCATING ENGINES

Just now the question constantly arises as to whether it is best to purchase turbines or reciprocating engines. This must depend upon the original costs, the space occupied, the relative economies when new, the maintenance of economy after operation begins, the reliability, and the repairs.

In order to throw light upon the original costs, I give below the prices to be expected at this time of several units of each kind of prime mover. These are for sizes in which the kilowatts are real outputs at 80 per cent. power factor.

For the information of persons who are not

versed in electrical matters it is well to state that an alternating electrical generator when on a power load does not give out its full rating in useful power. If it gives out 80 per cent. of its rated capacity it is said to have an 80 per cent. power factor, and this is the power factor to be expected in textile mills. In chocolate factories it is likely to be a little below 70 per cent. In machine shops it is likely to be about 60 per cent., and for this reason direct current is preferred in shops of this kind. For lighting and electrolytic loads the power factor is 100 per cent. There is a current which occupies, so to speak, the capacity

F. W. DEAN.

between 100 per cent. and the per cent. indicating the power factor, but it can do no work. It does not, however, consume power to produce it, because this part of the power is reflected back and forth between motors and generator and gives back to the latter the power sent out.

It heats the wiring and generator slightly and causes the use of a larger generator than would otherwise be necessary, but this is the only loss of power caused by a power factor below 100 per cent.

COSTS, ETC., OF VARIOUS SIZES OF RECIPROCATING ENGINES AND TURBINES

With Condensing Apparatus and Exciters, all Erected, Including Foundations (Capacities Given in Real Outputs)

Capacities	Horizontal 4-Valve Engines	Horizontal Turbines
500 k. w.	$22,700.00	$12,250.00
1,000 k. w.	40,200.00	17,900.00
1,500 k. w.	62,200.00	23,800.00
2,000 k. w.	76,400.00	30,500.00

Capacities	Space Occupied Engines	Turbines
500 k. w.	18 ft. x 26 ft.	14 ft. x 6 ft.
1,000 k. w.	24 ft. x 30 ft.	14 ft. x 8 ft.
1,500 k. w.	26 ft. x 35 ft.	19 ft. x 9 ft.
2,000 k. w.	28 ft. x 37 ft.	21 ft. x 9 ft.

From this it is evident that the comparison is wholly in favor of the turbine.

The relative economies to be expected from the two types are given in the following table:

STEAM CONSUMED PER KILOWATT HOUR

Pressure 150 Pounds

Engine

Capacities	Saturated Steam Guaranteed per Kilowatt Hour
500 k. w.	lbs. 18.67
1,000 k. w.	18.80
1,500 k. w.	18.80
2,000 k. w.	18.93

Vacuum 26 inches

Engine

Capacities	Superheat 100° Fah. Guaranteed per Kilowatt Hour
500 k. w.	lbs. 16.8
1,000 k. w.	16.9
1,500 k. w.	16.9
2,000 k. w.	17.0

Vacuum 26 inches

Turbine

Capacities	Superheat 100° Fah. Guaranteed per Kilowatt Hour
500 k. w.	lbs. 17.7
1,000 k. w.	18.0
1,500 k. w.	16.8
2,000 k. w.	16.6

Vacuum 28 inches

From these quantities it will be seen that there is little to choose in the economy of one type of prime mover over the other. It is said that an experimental turbine of 10,000 kilowatts capacity has been tested that used 12.95 pounds of steam, superheated 100° Fahrenheit per kilowatt hour and there is every probability that the turbine will be improved.

Concerning the maintenance of economy it is well known that the best reciprocating engines, with either Corliss, gridiron or poppet valves, maintain their economy for years, and it is also well known that the blades or buckets of turbines have been eroded by the steam as it passes over them. There are instances of this erosion being sufficient to make the replacement of blades necessary, as there was a great falling off in economy. Blades have eroded rapidly in some cases, so much so that it has been necessary to replace a set at a cost of several thousand dollars in five years. It appears to depend largely upon the material of which the blades are made, and improvements in this respect have been made and are being made. Turbines are not stripping blades

nowadays as they did a few years ago. Concerning repairs in other respects than this I believe they are very slight, much less, in fact, than with piston engines, and in many cases no blade replacements have been needed.

It will be noted that turbines are always provided with condensing apparatus of sufficient capacity to give a vacuum of at least 28 inches. It is assumed by all operating engineers that a vacuum of anywhere from 23 inches to 27 inches is desirable for a reciprocating engine, the reason being that there is more economy in obtaining feed water from the condenser discharge with the higher temperature due to a poor vacuum, than there is with the lower due to a high vacuum. This belief may have had some truth in it in the days when the air and feed pumps were worked from the main engine, and when separate steam driven auxiliaries were not used, the exhausts of which are now used for heating feed water, and when also other means of heating boiler feed were not known or used. I believe this idea at the present time is a mistake, and that it will always be found that a condensing engine with a high vacuum is more economical than one with a low vacuum, not only in steam consumption, but in coal consumption, especially when the feed water is not taken from the condenser discharge. The other belief seems to be world wide, and apparently has been handed down from the distant past.

The turbine also is usually given the benefit of superheated steam, but it appears to be claimed both by turbine and engine builders that about one per cent. of steam is saved for each 10° Fahrenheit of superheat. The use of highly superheated steam in locomotives has reduced the steam consumption to 16 pounds per indicated horse power per hour, and the coal to 2 pounds while running, which are not much above ordinary mill engine practice.

It should not be overlooked that the most economical steam engine is the non-condensing engine, the exhaust steam of which is utilized, and in this application the turbine shares. It is not as economical when non-condensing as the engine. In other words it produces more exhaust steam for the same power, but if this is all utilized it makes no difference.

The turbine also shares with the compound engine the opportunity to draw steam for manufacturing purposes between the expansion stages.

There is an important application of the turbine that is not shared by the piston engine. I refer to the exhaust steam turbine. While, in my opinion, the economy of the piston engine would be improved by a high vacuum, recently low pressure turbines have been placed between the low pressure cylinder and the condenser, simultaneously with an improvement in the vacuum. The turbine lends itself to this application better than a piston engine, for to obtain a similar result with the engine, an enormous low pressure cylinder would be required. Low pressure turbines can operate with the collected exhausts of any number, kind and size of engines, and great economy is sure to result. Moreover the mixed pressure turbine will be automatically supplied with live steam as the supply of exhaust steam diminishes or fails.

Steam turbines practically cannot be applied to direct current generators unless they are geared so that the generator revolves sufficiently slowly to diminish commutator difficulties, so that, while direct current turbines are made, the contemplation of a turbine presupposes, ordinarily, alternating current. Still further, the adoption of a turbine carries with it the use of electricity in driving shafting or machines directly. This brings us to the consideration of the use of electricity in textile mills.

If a mill permits the application of a piston engine with simple straight belt or rope drives, this is undoubtedly a more efficient method of driving than by electricity. If the drives are indirect the friction load may be as much as forty to fifty per cent., and electricity is the more efficient. The saving by the engine and mechanical drive is slight under any circumstances, and as such a saving is a small percentage of the power costs, and this a small percentage of the total operating costs, this phase of the matter is of small consequence.

There are advantages in electrical driving, among which may be mentioned smaller space occupied by the prime mover, absence of a belt tower, head shafts, pulleys and belts or ropes, any amount of sub-division of drives with the resulting opportunity of shutting down groups of machinery, the application of motors to separate machines, and the measurement of the power which a motor gives out. It is said that efficient variable speed motors will soon be in the market, and these will be a convenience.

I do not include in the above advantage that of an increased output by electrically driven machinery, which is claimed by the makers and salesmen. I am unable to understand how machines driven by electric motors can go either faster or steadier than those driven by belts. If there has been an increase in product in any case it must have been due to removable defects of the original drive. It is evident that this must be so in an extended group drive, for there is little or no diminution in the number of belts used. It would therefore only be in individual drives that the increase would exist and here I can see no reason why the belt cannot do whatever the motor can. I have never heard any reason given for the claim of greater output that could be understood, and in the discussion of this paper the reason should be clearly stated.

Speaking in a general way, the advantages of electricity are such that it is probable that it will be in the early future universally used for driving textile mills. One reason for this, not thus far mentioned, is that it permits a central steam plant to be used under all circumstances, and this adds to efficiency and minimum charges of all kinds, especially in an overgrown mill having several steam plants. A further consideration of the matter leads to the inevitable conclusion that prime movers in textile mills will in the near future, be steam turbines operated by superheated steam of rather high pressure. The economy of turbines is increasing and is likely to surpass that of piston engines in the near future.

In bad water districts the fact that turbines use no oil in the working steam is of the greatest advantage, for with surface condensers the pure

water from the condensed steam can be used in the boilers and thus avoid the boiler troubles that come from bad water.

THE BOILER PLANT

It is well known that I am a strong advocate of fire tube boilers, either the vertical or the horizontal return tubular. The reason for this is that plants equipped with them are cheaper to build, and the boilers themselves are more economical, more easily cleaned, and safer than water tube boilers. No horizontal return tubular boiler built with butt joints has exploded, nor has any straight or conical shell vertical boiler with such joints exploded, so far as I know. There have been many disastrous explosions of water tube boilers.

Water tube boilers having tubes expanded into drums, have, in these drums, structures in unstable form, and thereby likely to change shape with variations in temperature. This causes the plates to bend back and forth in the weakest place, thus causing a likelihood of rupture in the same manner as in the case of shells with lap joints. Water tube boilers have from two to four drums, and each one of these is more likely to explode from the effects of distortion than the well balanced shell of a horizontal or vertical fire tube boiler.

The economy of the fire tube type is greater than of the water tube, because the tubes can be kept cleaner, because they are as clean on the fire sides when old as when new, because they do not short circuit, and because they are not partially covered up by baffle tiles. Another important reason for greater economy is that water tube boilers have several doors and clean-out holes in the brickwork, and these leak air especially after the boilers have been in use some time. This cools the gases, reduces the economy and also that of the economizer if one is used.

MEMBERS AND GUESTS AT THE MEETING

Concerning the safety of fire tube boilers the butt joint has done much to this end, but such joints with the outside covering plate narrower than the inside are not ideal, and boiler makers should abandon them and use covering plates of equal widths.

Here I wish to take the opportunity to encourage the use in large mills of large boilers, say of 400 or 500 horse power, instead of 150 to 200 horse power. The large boilers are just as safe, slightly more economical, take up less room, reduce the

number of steam pipes, blow-off pipes, stop valves, blow-off valves, feed valves, water columns, steam gauges, and reduce the amount of brickwork and pipe covering. I also want to encourage the use of stronger draft and more rapid combustion, with the object of reducing the number of boilers and firemen, as the number of boilers in some mills is absurdly large. Coal can be as properly burnt at a rapid rate as at a slow rate. It is merely a question of adaptation of the method of firing, and firemen can be as well schooled to fire for rapid combustion as for slow.

OF THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS

PURCHASED POWER

The outside central station companies are making active efforts to sell electric power to textile mills as well as to mills and factories of other kinds. The price is given at so much per kilowatt hour at the mill switchboard. They are especially anxious to do this because it keeps a plant the size of which is determined by the night lighting requirements, from earning next to nothing during the day time, and they consequently are able to make low prices. I have investigated the cost of producing power in many cases in mills and have compared it with the cost of purchased power, and invariably found that it is advantageous for the mill to produce its own power. In textile mills it is more advantageous than in most other kinds, as the plants are usually of considerable size and adapted to the most economical production of power due to their size and uniformity of load. This is particularly the case in mills where considerable steam is used, and especially where exhaust steam can be used as for dyeing, to say nothing of slashing and heating. In such mills there is no chance for purchased power, and in mills where steam is used for power and heating only, every means for low cost of power which the public station can use is available to the mill, with a probability of more care being taken in operation.

In factories where the power required is intermittent, and the shafting friction large, as in a boiler shop, purchased electric power is advisable, unless electricity is generated in some other part of the plant for other purposes. In either case electric individual driving is advisable.

In this connection circulars have been distributed giving the cost of power as produced by the Fitchburg Yarn Co., and I propose to examine into this to some extent. As I have made no tests I cannot speak with full knowledge, and can only speak as to probabilities.

The engine is a Hewes & Phillips horizontal

cross compound with cylinders 25 inches and 56 inches by 60 inches stroke, running at 85 revolutions per minute, thus having cylinder ratio of 4.64 to 1, and a piston speed of 850 feet per minute. The steam pressure is 175 pounds, and the boilers are Manning vertical with tubes 17 feet long and about 5 1/2 feet of these is superheating surface. It is said that the superheat in the boiler room steam main is 40° Fahrenheit. There are five of these boilers, each having a grate 7 feet in diameter, 2,090 square feet of water heating surface and 933 square feet of superheating surface. Four of these boilers are used, one always being out of service. The chimney is 6 feet in diameter and 165 feet high.

The high pressure exhaust steam passes into an empty receiver of considerable size, well covered, and the low pressure exhaust passes through a tubular feed water heater. The condensing apparatus has a main pump and a dry air pump, both worked by a small Corliss engine. The exhaust of this engine passes into a secondary feed water heater, and no other exhaust enters it. The condensing water comes from the river and is not used for feed water as it leaves the condenser, probably on account of its quality. The feed water comes from the city supply and by its own pressure passes through both heaters to two belt driven triplex pumps which send it through a Green economizer to the boilers.

It is said that in general the feed water enters the primary heater at 44° Fahrenheit, enters the secondary heater at 118° Fabrenheit, enters the economizer at 152° Fahrenheit, and leaves it at 232° Fahrenheit. These figures are probable, judging from temperatures that I noted on March 4, 1913.

A source of economy is the fact that the city water pressure is 150 pounds, and this renders a fire pump unnecessary, thus permitting banking the fires just sufficiently to keep them during shutdowns.

Observation of the firing shows that a small amount of coal is being used. The fires are thin and handled with care. Two firemen are employed during the day, and one at night, the watchman having nothing to do with the fires.

In one of the circulars referred to it is deduced in an indirect way that the actual evaporation per pound of coal is 11.5 pounds of water. While this is improbable, it is not impossible, as I have made a few boiler tests in which this result would have been slightly surpassed if the temperature of the feed water had been 232° Fahrenheit, as at the Yarn Company's. The care, however, used in firing on a test is not likely to be used every day, although it should be.

The engine is said to use 1.189 pounds of coal per indicated horse power per hour exclusive of banking coal. This is small, but not impossible, as I have tested four engines (one being a pumping engine, and the others mill engines) which would have used slightly less coal if the evaporation had been 11.5 pounds, as above claimed. Such a result as this is dependent upon the power of the engine as determined by the indicator, and here is a possible weak point in this case. The indicators are of the best, probably have correct springs, but they are operated by a very long cord, are connected to the crosshead by a limber rod projecting out a foot or more from the crosshead, and the indicator pipes are long and springy. These features produce diagrams that are probably too thick and too long, but to what extent I do not know. It may be open to question, also, whether the average power of the engine is sufficiently accurately shown by diagrams taken twice a day, although of course, the power is very uniform in a mill of this kind.

The coal used for heating, as stated in the circular, has been criticised, but the more it is the less there will be left for power.

The cost of labor is given as $2.92 per indicated horse power per year, but the salaries and wages amount to $4,100 and thus figures out to be $2.35 per indicated horse power per year instead of $2.92.

Supplies and repairs are given as $1.11 per indicated horse power per year. Calling the rated power of the engine 1,600 horse power and assuming the cost of the whole power plant, including buildings and chimney to be $50 per horse power, the total cost would be $80,000. It is common to estimate the cost of repairs at two per cent., or in this case $1,600 per year, and oil, waste and supplies cannot be far from 20 cents per horse power per year, or say $0.20 × $1,600 = $320. The total cost of oil, waste, supplies and repairs would be $1,600 + $320 = $1,920. This divided by the average indicated horse power gives $1,920 ÷ 1,744 = $1.10 or slightly less than the amount given.

It is stated that the coal used for banking throughout the year is 422.9 pounds per indicated horse power per year, or 422.9 × 1,744 = 737,538 pounds total. If the mill runs 2,856 hours per year, the number of hours during which banking occurs is 24 × 365 — 2,856 = 5,904 hours. Four of the boilers have a total grate area of 153.92 square feet. The coal used for banking per square foot of grate per hour is 737,538 ÷ (153.92 × 5,904) = 0.81 pounds. Under the peculiar absence of the need of steam during the hours when the engine is not running as above described, this is enough coal for banking.

The depreciation and interest are given as $4.01 per indicated horse power per year. If the life of the plant is assumed to be twenty-five years, the depreciation will be 4 per cent. If money can be borrowed at 4 per cent., the two items amount to 8 per cent. Eight per cent. of $80,000 is $6,400, which divided by the horse power is $3.67, or less than the allowance of $4.01.

Concerning taxes and insurance, the tax rate in Fitchburg is say $18 per thousand, and if assessed upon 80 per cent. of the value, the tax in this case is $18 × 80 × 0.80 = $1,152. $1,152 ÷ 1,744 = $0.66, which is less than that given in the circular. Insurance in the mutual companies nets about $50 per $100,000, or $40 on $80,000. $40 ÷ 1,744 = $0.023, or less than that given in the circular.

The following tabulation of the figures deduced above can be made:

Coal used per i. h. p. per engine .....lbs.	3,199
Coal used per i. h. p. for banking	423
Coal used per i. h. p. for heating	288
Total	3,910
3,910 lbs. at $4.50 per long ton	$7.88
Cost of labor	2.35
Supplies and repairs	1.10
Depreciation and interest	3.67
Taxes	0.66
Insurance	0.02
	$15.68
Deduct cost of heating, 288 lbs. coal at $4.50	0.58
Final cost of horse power per indicated horse power per year $15.10	

which is $1.58 less than claimed in the circular.

From this it is apparent that textile mills can be operated by their own steam plant at a very low cost for power, if the indicated power is correctly given. The above cost is given per indicated horse power per year or say $15.10 ÷ 2,856 = $0.0053 per hour. If the friction of the engine is 5 per cent. and the efficiency of a generator is 93 per cent. this corresponds to 8/10 of a cent per kilowatt hour at the switchboard, and this is in a mill that has almost no use for low pressure steam. With such a result, purchased power is out of the question.

Sidney B. Paine—I feel a great deal of interest in Mr. Dean's paper and I desire to welcome Mr. Dean to our side of the house, as he has unequivocally stated that the electric drive, as he understands, is the proper drive for textile mills.

Mr. Dean has asked a fair question, and I think he is entitled to a fair answer, as to why belts cannot do as well as motors in giving the production in a textile mill. Belts can, but they don't. They can, but it would cost too much to keep them up and make them do it. I have here a few figures which we have made on tests in textile mills, almost entirely in cases where the group driving has been used, which of course is one step better than the mechanical drive, in so far as the opportunities for lost speed end when the belts have been removed. I am not going to discuss at this time the reason why we can drive faster. I am going to assume for the moment that we cannot drive the machinery any faster, although I hope very shortly to be prepared to give figures to prove that we can drive it faster by motors than we can by the belts. But aside from the question entirely, assuming the same speed, on a group driving, with its long lines of shafting, I think Mr. Dean will agree with me that there is always a torsional disturbance at the end of that shaft. Many engineers have tested it. I have seen some very effective curves, and very interesting curves, showing that disturbance at the end of the shaft. Of course, the shaft turns as fast at one end as the other, but it lags behind, there is a spring movement, and every time the load moves that spring acts. I have seen one weave shop where they couldn't weave a certain grade of cloth on the loom at the end of the shaft on account of torsional disturbance. That, of course, is removed by the motor drive, the individual drive. The principal trouble with a belt drive occurs from its slipping. Here are some tests that have been taken in different mills. In one worsted mill, with its nine looms in the same room, and driven from the same shaft, supposed to run at the same speed, they varied from 123 to 134. In one cotton mill, in the same room, with its thirteen looms on the same shaft, they varied from 189.1 to 199.1. Another, thirteen, varied from 164.3 to 171.4. Another thirteen from 158.5 to 166.3.

It may be said, of course, that those looms were not properly taken care of. Then we made a test of one loom for thirteen consecutive working days, taking the speed at the same hour each day, so that the conditions were as nearly practical as possible, and the variation in these thirteen consecutive working days at three o'clock in the afternoon was from 157.1 to 166.2.

Another interesting test was made in one large room which had 105 looms in the room. This is one of the best and largest of our cotton mills, one that is most successfully managed. The average speed of the 105 looms in this room was 156.6. The range was from 150 to 164. In that room we installed a motor and ran one loom at 162. The overseer said that he could run his belt-driven loom just as fast. I admitted it; but, as I expressed it, "It is a Marathon, not a sprint, let it run." It ran for several days, with a good deal of attention to the belt, and kept pretty close step. At the end of three weeks they gave up the race and the long-distance runner won out. The speed dropped from 162 to 156. It is running there today. That loom can run 162 if they will keep after the belt, when it doesn't slip.

Now, to go back to this room where 105 looms were used. The average speed, as I said, was only 156.6, the maximum speed was 164, and the situation was that all those looms were supposed to run the same speed, with a loom running 164 here, a second loom over there running 154, and the highest speed loom was the farthest away from the prime mover. There were five shafts. The slowest speed, running at 150, was the next shaft to the prime mover, so it was not in improperly stepping. All of those looms could have run at 164 if any did.

The difference in production between the average speed, 156.6, and 164, on an 80 per cent. load factor, that is to say, with looms running 80 per cent. of the time, would have amounted to 692 yards per year. If they had run at the speed that we subsequently ran our motor, at 170, in that room, the difference between the average speed and 170 would have been nearly 1,100 yards per year.

In the Duneen Mill at Greenville, S. C., they have 1,200 motors on their dobby and jacquard looms. They ran more than three minutes together. Of course, the power of a loom varies, and the speed of the induction motor varies with the loom. A very small change in power will change the speed very slightly, but that will show when we stand at the end and see them beating up.

There are other advantages in connection with

this individual drive, which Mr. Dean has so strongly recommended. There is, of course, the question of cleanliness. With a properly constructed motor there can be no uncleanliness at all from the bearings of the motor. The bearing is not oiled; it is waste packed, the same as the journals on passenger cars. There is no oil to come there, there is no oil on the floor. There is absolute cleanliness about the room. There is no head shafting to drip on to the cloth and make stains. There is no danger to the operatives from being caught in the belts. There are no belt men repairing broken belts and shutting down your looms when they are running. All these advantages come in with the individual drive. Still another advantage, which Mr. Dean has touched on, is the question of efficiency. With the individual drive the little motor has an efficiency of 82 to 84 per cent.; the big motor has 91 per cent. I do not know any mill engineer that was ever able to design a weave shop with a loss of only 7 to 9 per cent. in shafting and belting. The little motor stops its power when the motor stops, and the motor can be stopped when the loom is stopped. Group driving, or, worse yet, mechanical driving, continues to lose its power even if you do stop. When all the looms are running the little motor is more efficient, and when you stop its efficiency still further increases.

The ideal drive would be to hitch the prime mover directly to the producing machine, in other words, attach your engine right to the loom. That, of course, is impossible, and we have had to use shafting and belting in order to connect the prime mover to the loom. But the shafting and belting has no part in the productive process. It is simply a means to an end, because a necessity with the mechanical drive. The belts do not produce a pound of cloth; they are simply the means of connecting the power to the loom. You have been so used to seeing shafting and belting driving your mills that you have attached the same value to it that you have to the loom itself. It has no part in the productive process. It is simply the means of enabling you to connect your engine to your loom.

Less than a hundred years ago, when you carried your produce from the mill to New York you went by sailing vessel or by the horse-drawn vehicle. That sailing vessel still exists, and so does the horse-drawn vehicle, but you are not sending your stuff that way today. The shafting and belting in your mill are no more necessary for the transportation of the energy of the engine to the loom than is a sailing vessel or the horse-drawn vehicle to carry your product to New York. It has served its time, and served it well. The day of the mechanical drive has gone by. The day of the electric drive has gone by. We are coming to the day of the motor drive. The electric drive, as you understood it, was a modified mechanical drive, and it has been a splendid and very serviceable modification, but that is passing, and the day of the motor drive is at hand. There are thousands and thousands of machines today in this country running with individual motors, and that to my mind is the ideal system, because, as I said a moment ago, it connects the prime mover directly to the loom, it gives you the speed of the prime mover at the loom without any opportunities for loss at all, and therefore it is the ideal system, and that is what Mr. Dean has advocated in his paper.

William W. Crosby—I do not want to disagree with Mr. Paine. I realize that a motor that is synchronized, as an alternating current must be, with the prime mover, is dependent on the governing of the main engine, and it will run a drive as the main engine is governed, but I do not like to see the poor old belt condemned too hard, because the loss is not chargeable entirely to the belt. One of the most interesting personal contacts I ever had with a case of variable drive was in a weave shed of rather large dimensions, weaving very fine goods, a good many threads to the inch, and the looms in the same alley were doing most unusual stunts as to variation. It was found that the overhead pulleys varied in diameter by considerable amounts. The next thing was that the looms, which were made by one of our best known loom builders, had driving pulleys of tremendous variation. When you think of the fine degree of regulation that mill wanted to take care of this very fine product, and then consider the clutches on the looms, each of which things contributed to the variation—and even greater variation in speed than Mr. Paine has quoted—there are some things that may be said, that we should not forget, on the other side of the question.

Then one word more. Mr. Paine has spoken of a weave shed full of looms which are beating together and soon lose the synchronization when driven by belts. I think that we would have some trouble with weave sheds if we should get a whole roomful of looms beating together. Some of you may have been up against it. I have, and it has caused some serious trouble. If we are to have this very perfect regulation, we shall have to look out not to knock our sheds down. When soldiers are keeping step across a bridge the bridge is subjected to a severe strain, and so it may be necessary to consider whether we shall not have to do something to keep our sheds from falling down.

John L. Burton—The last speaker need not be at all alarmed, whether driving by motor or belting, because it is a well known fact that the variation in speed on a loom, other things being equal, is caused by the light and heavy lift on a fancy piece of cloth, and you can vary your power on the loom by the way your cams are set on a plain piece of cloth. I do not think that the cams are set entirely the same, and you will not have several hundred looms that are all lifting the same. Under this Democratic tariff I don't think you will have much trouble anyway.

WASTEFUL METHODS IN THE COTTON INDUSTRY

By WILLIAM H. HARRISS, Treasurer Slater Manufacturing Company, Pawtucket, R. I.

The important items to be considered, in attempting to suggest improvements in the industry, are as follows:

1. Misdirected efforts in farming operations.
2. Lack of care in seed selection.
3. Study of soil condition.

4. Recognition of weather conditions at time of planting.
5. Proper physical location of seeds and plants.
6. Better cultivation of growing plants.
7. Study of diseases and pests.
8. More efficient methods of picking, and care before ginning, such as ageing.
9. The concentration of ginning plants in larger units.
10. Better ginning and baling.
11. Better handling by compresser, transportation companies, etc.
12. More facts about the actual contents of a bale, such as length of staple and percentage of short staple.
13. A national body with authority to settle disputes in the buying and selling.
14. Revolution of picker room machinery, to avoid damaging of fiber.
15. More careful study of waste from each department.
16. Better labor discipline.
17. Elimination of the sample piece abuse.
18. Better general efficiency in processes and management details.

In considering the above rough outline of some of the more important things to be done to bring the industry into a more efficient condition, it will be seen that items (1) to (8) are primarily responsibilities of the farmer, or grower, of the cotton.

It will also be seen that items (14) to (18) primarily concern the cotton manufacturer, whereas the intermediate items (9) to (13) are apparently no one's business in particular, and therein lies the cause of so much abuse.

I will not attempt to discuss these different headings with too much detail, as the time is limited.

MORE FACTS ABOUT THE ACTUAL CONTENTS OF BALES, SUCH AS LENGTH OF STAPLE AND PERCENTAGE OF SHORT STAPLE

This is the subject that has caused us all so much trouble, gray hair, and actual loss of money, —the mooted question of what is inside of a bale of cotton. We always find leaf and trash, oftentimes dirt and sand, frequently water, occasionally rocks or stones and on certain stated times a chicken or negro boy. But how about that commodity—staple, for which we paid our money? It is probably not going too far to say that we cotton manufacturers really know less about our raw material than any class of manufacturers in the country. I have always contended that we should give more thought in the future about the contents of a bale, and not spend so much time, as we have in the past, with arguing about the tare of the bags and ties. If it happens that a man ships you a bale of cotton with 30 pounds of tare, when he only has a right to ship 22, then you are arguing over 8 pounds at, say 20 cents, or a total of $1.60. This, of course, is quite an important amount, but it is insignificant if the particular bale under discussion, which is often the case, is stapled to be 1 3/8 inches long, where only a very small percentage is this length, and the balance short and wasty staple. This may mean $5.00 or $10.00 a bale, and should certainly deserve a greater portion of our thought and study. Unquestionably many bales of cotton invoiced and received on the same lot and class vary in intrinsic value from $5.00 to $10.00 a bale.

The present method of stapling cotton by hand is inadequate, and in a way can be compared to the time before Whitney, when the cotton was ginned by hand, and the industry was young. Some method must be developed to staple cotton and analyze the percentage of moisture, waste and short staple by machinery, and while nothing definite can be said on this subject, here, yet the writer knows that certain well defined attempts have been made in this direction, sufficient to hold out some slight hope for the final solution of this most important problem.

A NATIONAL BODY WITH AUTHORITY TO SETTLE DISPUTES IN BUYING AND SELLING

In the present condition of the trade, when the contents of a bale of cotton must be settled by the variable personal opinion of individuals, it is to be regretted that some national body cannot be organized, with authority to settle disputes, or better still, to pass upon every bale of cotton and stamp its grading and stapling thereon, before it gets into the markets, something in the manner of the Silk Conditioning Committee in Milan, Italy. It is true that today in the grading of cotton we have the classification committees of the exchanges, but they will take no position in regard to other things than grade. They do not recognize staples except in a very inadequate manner, under the head of Gulfs. In this connection it would seem that the future must bring forth a recognition by the exchanges of staple cotton, for as time goes on we will cease to buy cotton by the pound except as a medium of exchange, but the real trade will be in buying staples, somewhat in the manner that today coal is purchased by the large users. They do not buy by the ton except as a basis of exchange, but by the real intrinsic value, determined by the number of British Thermal Heat Units in a given quantity. Something must be done in this connection, for it has been established that there are something over two hundred varieties or types of cotton planted and raised in the South each year, and as the situation becomes more complicated we must know more about the length of staple of each variety. If we cannot get the exchanges or the Government to take some action, then the cotton manufacturing industry as a whole will be forced to elect a body like the Board of Insurance Underwriters of Chicago, where problems of the trade are laid before them for final opinions before adoption.

Aside from stamping this approval or decision on a given bale of cotton, such a body could be of much service in rendering opinions as to the value of certain efforts that are being made to solve some of the problems that we have before us. One reason why the cotton growing and ginning industry has improved so slowly is that those people who really are attempting to make improvements, and they are many, have no final body before whom they can lay the results of their effort for scientific and just decision.

REVOLUTION OF PICKER ROOM MACHINERY TO AVOID DAMAGING FIBER

Very little will be said on the subject of the details of cotton manufacturing, as concerns the processes through the mill, as these are too well understood by you, and are not pertinent to this paper. I will point out, however, that we must not expect all the improving to come from the other end, and where we do have damaging conditions in our mills, they should be righted. I have always claimed that one of those conditions exists in our picker room. Unquestionably, picker room machinery has not kept pace with the improvements in other processes of the industry, and much remains to be done in this department. Perhaps you have been impressed with the fact, as I have, that in discussing the subject of the cotton industry from the time the seed goes in the ground until finished cloth is delivered to the customer, the one paramount consideration is the conservation of the length and the strength of the original cotton staple, and while we are asking the farmer and the ginner and the handler to conserve this length, it certainly behooves us to do everything within our power to act accordingly.

MORE CAREFUL STUDY OF WASTE FROM EACH DEPARTMENT

Now we come to the subject about which it seems we all like most to talk, and apparently very few have any real knowledge. It has been said in jest that the lawyer's mistakes swing six feet in the air, and the doctor's mistakes are buried six feet in the ground, and I should say that the mill man's mistakes are hidden six feet in the waste bin. If I were asked to pass upon how any mill is being operated, with the privilege of examining only one department before expressing an opinion, I should request to be shown into the waste house. I have always thought that if the average mill did not usually consider putting their waste house in the darkest and most out of the way place around the premises, as is the common practice, but instead, should give it the greatest possible exposure, it would show a great decrease in its annual loss. The observant waste dealer probably knows much about how the average mill is run, and this may be the reason why we all like to keep on the good side of him, for he might do some talking.

As to the manufacture of this waste from the different departments into salable products, I will say that this is an industry within itself, and for its proper manipulation unquestionably requires more skill and experience than does ordinary cotton manufacture. It is a subject, however, that we are being forced to consider more seriously each year. Certain manufacturers and machine builders are attempting to keep abreast of what is going on, the world over, looking to the day when their by-product, in the present form of waste, will leave their plants in some class of manufactured merchandise, instead of a waste product of raw material.

BETTER LABOR DISCIPLINE

Since there has been such a shortage of efficient labor in our industry, certain abuses have been allowed to develop that need serious attention. I think it is incumbent upon the managers of plants to decide if they are not more or less responsible for the conditions. We put up to our superintendents the problem of properly running the inside of the mill. He, in turn, passes on to his overseers the question of the proper manning of machinery, and processing, and under the stress of circumstances, brought about by the scarcity of skilled labor, the average overseer is between the upper and nether mill-stones. If he does not get labor, his job is in danger, and if he gets labor and watches them closely, he cannot keep them. The result is there has been a breaking down of the usual discipline that was in force years ago, insofar as little abuses have crept in. The help are allowed more freedom in leaving their machinery before stopping time, and running around their room, with the result, instead of getting a full week's running time of machinery, the percentage is decreasing every year. It would seem that a close relation between the managers, superintendents, and head of departments, in solving this problem, would be beneficial to all concerned. I am glad to know you have a paper prepared on this very important subject.

ELIMINATION OF SAMPLE PIECE ABUSE

Owing to the condition of business for the last few years and stress of attempting to keep machinery running, another abuse has developed, in the form of too free execution of sample piece orders. Unquestionably, on a certain class of fabrics, sample pieces have to be made before business can proceed, but the indiscriminate making of sample pieces cannot do other than injure the markets, by misrepresenting the actual amount of goods that can be purchased, to say nothing of the great increase in manufacturing cost occasioned by so many sample pieces. It has been suggested that in addition to the actual quotation price on a sizable order for a given cloth, the original order taken for samples should carry with it an arbitrary sum of, say, $10, per sample piece, over and above the yard quotation for the cloth. If people ordering sample pieces realized they had to pay $10 for the privilege of having a sample made, which, by the way, would not always cover the expense by any means, they would be more careful in their decision to have sample pieces made, and would look more carefully into the possibility of developing actual business in that line.

BETTER GENERAL EFFICIENCY IN PROCESSES AND MANAGEMENT DETAILS

Whether we believe in the much discussed question of the time,—Efficiency Engineering,—or not, I am satisfied that the manager who takes the position that there is nothing in it for him, will awake to the fact some years in the future that he was mistaken, and he is out of the race. Much that has been written on the subject is not pertinent to cotton manufacture, but there is good for all in the general movement, and we should all give attention and pick the good for our individual cases.

In conclusion I want to say that the problems that I have attempted to present to you here are

many and manifold, and the proper solution of them will take much time and labor, yet I do not want you to be unmindful of the tremendous amount of splendid work that is being done to overcome them. Many people are up and doing, to right these troubles, and I would feel very thankful if, in presenting this paper, I have impressed you with the large amount of good work that the United States Department of Agriculture is doing to solve some of the problems that have been presented here. I will also be thankful if I can impress you with the necessity of giving encouragement to the work that this department is doing, as well as a great class of earnest ginners and farmers in the South. You are all familiar with the good work done in establishing grades of cotton by the Government. I understand now that the problem of deciding the intrinsic differences in the value of these Government grades is being undertaken. The New York Exchange makes arbitrary fixed differences in their grades of cotton at stated times of the year. The New Orleans Cotton Exchange makes commercial differences from day to day, based on the market conditions in Southern points, but it is most important that we know what the actual intrinsic differences are, and this is what the Government will attempt to solve by a series of tests. Textile schools could also do much good in this connection.

This paper brought out considerable discussion, which was participated in by Messrs. W. W. Crosby, E. H. Marble and others.

Mr. Harriss was one of the first to call attention to the importance of working out the intrinsic differences in spinning values of different grades of cotton. We believe it was largely at his suggestion that the New York Cotton Exchange has recently taken up this matter and that the Department of Agriculture in Washington has given serious thought to investigating this subject.

SPINNING VALUES OF DIFFERENT GRADES OF COTTON

By GEORGE W. NEVILLE, President New York Cotton Exchange, 82 Beaver St., New York, N. Y.

In addressing you today on the subject of spinning values of the different grades of cotton, I do so with great hesitancy, fearing my limited knowledge of the subject may appear ludicrous to you gentlemen, who may be users of these lower grades; the finding a ready market for such being one of the burdens of my song, so to speak; but my desire to arrive at a more equable method of adjusting the price differences that shall apply to the deliveries of cotton against contracts of sale for the future delivery of cotton on cotton exchanges, fortifies me, for it is my conviction that if some basis can be determined along the lines indicated by this paper, much good will result to everybody in the cotton trade, from the producer to the manufacturer, and the ultimate consumer.

There is no single factor connected with the marketing of the cotton crop, with the varied assortment of grades in it, which the merchant has to buy from the farmer, so as to select the even running grades which the spinner requires for his sale of goods, that occasions so much discussion and interferes so greatly with the satisfactory distribution of the cotton crop of the United States by the cotton merchant, as the differences in value of the various grades of cotton above and below middling.

It is not necessary to state to you the variety and the uncertain proportions in quantity of the grades which the weather conditions of succeeding seasons enable the farmer to produce. One season may be favorable throughout and result in a normal crop with a very small proportion of grades below Middling; the following season may be abnormal in the extreme and the quality produced may be largely of the grades below Middling. The cotton merchant, in order to supply you manufacturers with the quality you need to enable you to produce and sell your manufactured goods, as the demand appears, must face all this uncertainty, and at the same time has to protect himself against price fluctuations on every contract he makes with you, either by purchasing the actual cotton in the South or by purchasing a contract for the future delivery of cotton on some exchange where such contracts are traded in.

The rules and by-laws of a cotton exchange, if this institution is to perform its proper functions to the cotton trade, have to be such as will take care of all the merchantable and spinnable cotton weather conditions enable the farmer to produce. The cotton exchanges where such contracts are traded in, viz: Liverpool, New Orleans, and New York, have a range of full grades delivered against a sale for future delivery, as follows:

Fair
Good Middling
Middling
Low Middling
Good Ordinary

There are sub-divisions of these full grades known to the cotton trade as half and quarter grades. The half grades are designated in the United States by the prefix "Strict," and the quarter grades by the prefix "Fully" and or "Barely." These sub-divisions are necessary so that the Southern cotton producer may obtain the true value of every bale of his cotton, some of which may not be good enough for one of the full grades and would be too good for the next lower full grade. In addition, there are certain tinged and stained grades which are accepted as a delivery.

The cotton exchange, as a business institution, is the evolution of the cotton trading as practiced in the middle of the last century, and when first established was intended wholly for the cotton merchants; but with the increase in demand for cotton goods and the increase of the cotton crop in this country, its facilities were broadened until today there is not a cotton manufacturer who either directly or indirectly does not avail himself of its use.

When first organized all the cotton exchanges in determining the values of the different grades of cottons for delivery purposes, used the so-called "commercial differences," i. e., the differences in price which the various grades above and below Middling were actually fetching in the markets daily; the prices being determined in fact by the offers and acceptances of merchants. The New York Cotton Exchange was the first to discover the possibilities of manipulation involved in this system and the consequent harm to merchants. It found that the entire contract market was being continually manipulated month by month, and that merchants who had purchased large lines of cotton in the South, of assorted grades, were finding their sales of contracts as hedges against their purchases, affected injuriously to them by the manipulation of these so-called "commercial differences," and of the price of contracts thereby. After a heated discussion culminating in 1897, this system of differences was changed by the New York Cotton Exchange to the two revisions or changes in these differences each cotton season, one in September and the other in November. The New York Cotton Exchange found this method answered all purposes admirably until the low grade crop of 1906-07, which proved to be the lowest grade crop ever produced in this country. Much disturbance necessarily followed in all contract markets and great dissatisfaction was expressed by the cotton merchants and spinners of the country, their criticism being directed particularly against the New York Cotton Exchange in spite of the theory and experience that the difference between the basis Middling contract price and the price of Middling even running will not invariably rule at a uniform amount, and in the nature of the business cannot do so, even with the most drastic daily revisons of the grade differences. The reason for this is that the basis middling contract price represents constant trading in the range of grades deliverable, with which all who use the facilities of the exchanges are familiar, and the wide disparity between the basis middling price and the even running middling price is caused by the scarcity of that particular grade or higher grades, due to a low grade production by the farmers. The Liverpool market is the greatest of those having the daily revisions. The difference between even running middling on the spot and the price of their basis middling contract on the 15th inst. was 26 Liverpool points or 52 points our currency, and the difference in New York on the same date was 50 points.

At the request of your organization and of The American Cotton Manufacturers' Association, committees from your spinning organizations met committees from the New Orleans and New York Cotton Exchanges to consider certain complaints and recommendations which your joint committee presented. After a prolonged discussion, the following was agreed on by all parties to the conference:

1st. The New York Cotton Exchange should have another revision in February of each year, making three each season.

2d. The adoption of the Government standards when made of Upland cotton.

3d. The New York Cotton Exchange to issue certificates of classification for single bale certificates, if it could be done without too much expense.

The first has been complied with and was effective last February.

The second could not be done owing to conditions the New York Cotton Exchange could not control, although the resolution was presented to the proper parties, as passed by the conference above referred to.

The third has not been done as warehouse labor cost was found to be prohibitive, but the method of issuing the grade certificates has been changed from that ruling before the conference, which all agree was for the better.

The management of the New York Cotton Exchange still believes its system of adjusting differences is fairer to the cotton trade, and is sustained in this belief because the Bremen Cotton Exchange, after a study of the by-laws and rules of all cotton exchanges, has adopted the three revisions of each season, viz.: September, December, and March. They begin trading in contracts for the future delivery of cotton September 1st next. While this method is better, in our opinion, than the so-called "commercial difference system," still the fact remains that whatever may be the action of the committee of the exchange having to do with the changing of the differences in September, November and February, that action is always open to criticism on the part of some one, whether justly or not; and those merchants or spinners having contracts open are liable to find that the values of these contracts are substantially changed, either favorably to one, or adversely to another. Hence it is our opinion that method should, if possible, be inaugurated, that will not work hardship or a profit on anyone having contracts open on the cotton exchanges.

With this end in view, the New York Cotton Exchange caused spinning tests to be made to determine the waste and other losses involved in the manufacture of the different grades of cotton. The tests were made by the Clemson Textile School, of South Carolina, and the Lowell Textile School of Massachusetts, and the results obtained in these tests as regards the relative manufacturing values of the grades of good Middling, Middling, low Middling, and good ordinary cotton, are convincing that a system of differences so arrived at, and applicable on the percentage basis, is the fairest to all parties concerned. While these spinning differences on each grade of cotton may not be exact, yet the variations are so small that the benefits to the cotton trade would more than offset them.

The principal cause of any difference in the value of all grades as compared to Middling, is the foreign substance thrown out of the cotton in passing through the different manufacturing processes. This loss should be determined through ample tests by textile schools in the various Southern states and New England, or by the Agricultural Department in Washington as an arbiter. The treatment should, of course, be conducted on uniform lines in each test, and an average of all tests made to arrive at the commercially approximate

per centage of loss of each grade in manufacture. The cost of labor in the manufacture of each grade could also be worked out, and applied to each percentage of loss of each grade.

The yarns made from each grade could be valued and the percentage difference in value applied to each grade of cotton. This would determine approximately the grade difference on a percentage basis. If the basis middling contract were selling at 10 per cent. per pound and low middling shows a loss in excess of middling of 6 per cent., low middling would be deliverable at 60 points off middling, or 9.40, and the other grades in like proportion, and so on as the market advanced or declined.

In connection with the preliminary tests mentioned above, the value of the lower grades was further clearly established by ascertaining the breaking strength of the yarns made from each of the four grades. It may interest you to be given the details of these tests, which were made on a Goodbrand and Holland power tester, using a skein of sixty yards. One test was made from each of twenty-five bobbins. All the tests were made by one man who wound the yarn under uniform tension and carefully transferred the skein from the reel to the tester.

	Good Middling	Middling
Av. breaking strength .....lbs.	68.4	71.81
Av. weight 60 yards .....grs.	36.03	38.2
Average number	13.88	13.08
Strength per grain	1.89	1.88

	Low Middling	Good Ordinary
Av. breaking strength .....lbs.	65.4	63.1
Av. weight 60 yards .....grs.	36.9	36.0
Average number	13.55	13.89
Strength per grain	1.77	1.75

The meager tests made by the New York Cotton Exchange to demonstrate the practicability of applying this method of differences for determining the prices at which grades above and below middling should be delivered on contract of sale of a basis middling contract for the future delivery of cotton, also clearly demonstrated the spinning value of good ordinary, the lowest grade deliverable on a contract of sale for the future delivery of cotton, and many manufacturers to whom these yarns and results have been shown here expressed their surprise and stated they have since been using these low grades and the results are very satisfactory.

In this connection, it seems to a large number of the cotton merchants that cotton manufacturers could cheapen the cost of their raw material greatly, by purchasing the lower grades at the discounts prevailing, even when the average grade of the crop is normal; and when the grade of the crop happens to be abnormally low, these lower grades could be economically bought and used to great advantage; particularly is this the case when the yarns are dyed or the cloths printed.

BEAM DYEING, THE MODERN METHOD

By EDWARD W. SWIFT: Pres. Muscogee Manufacturing Company, Columbus, Ga.

The subject of beam dyeing is one which naturally attracts the attention and awakens the interest of all manufacturers of cotton goods, and particularly of those engaged in manufacturing colored goods, since it will not be a question admitting of any argument that if beam dyeing is worked out successfully, that it will be a tremendous stride forward in the art of dyeing, and the subsequent processes of converting the dyed yarn into the finished fabric, and will accomplish benefits and offer advantages to the manufacturer that will be greatly superior to any of the present and existing methods, all of which have their advantages and their disadvantages, but as a whole are recognized to be far from perfect.

In mentioning a little further along in this paper two of the present best known and most generally used methods of dyeing, viz.; the long chain system and the raw stock system, it is not intended to do so, by way of disparagement, but simply for the purpose of comparison and to bring out the most important points when considered in connection with beam dyeing, the modern method, as exemplified in the beam dyeing machine and system known as the Payne and Wallace, and owned, manufactured and sold by the Perfection Dyeing Machine Company of Columbus, Ga.

This machine and system, the first practical and successful beam dyeing machine ever offered to the trade, was invented five years ago and brought to its present state of perfection by Jesse M. Payne and George G. Wallace, practical cotton mill men. Mr. Payne being the superintendent and Mr. Wallace the boss dyer of the Muscogee Manufacturing Company, of Columbus, Ga., and it was thoroughly tested and perfected at this plant before being placed upon the market.

While this machine and system have been sold and successfully used for over two years, valuable and marked improvements in general and minor details have lately been brought out.

Briefly described, the machine consists of an open wooden tank, in which is arranged an iron tank, with removable top, and connected by a skilful but exceedingly simple arrangement or circulating piping, with a specially designed reciprocating pump, by means of which the circulation of the dye liquor is accomplished. A very ingenious warper beam has been designed and patented, consisting of iron heads and fitted with longitudinal wooden slats, so arranged that when filled with yarn, wound on the warper, the beam is placed in the dyeing machine and the dye liquor circulated from the inside to the outside of the beam and vice versa. The top of the iron tank in which the beam is dyed, is fitted airtight, and is easily and quickly removed and replaced. The dye liquor is first mixed in the wooden tank that surrounds the machine, and is heated by the coils of piping. The beam is continuously revolved during the process of dyeing. In one and a half to two hours, the beam is dyed, washed, dried

(water extracted) by compressed air, and is ready for the slasher.

By means of this system and machine, the white yarn is wound on the patented beam on the warper, carried to the dyeing machine, and from the dyeing machine direct to the slasher, eliminating all the troublesome and expensive processes incidental to certain other systems of dyeing, and at the same time working in harmony with all or any of them, if desired, particularly the raw stock or long chain systems.

The saving in labor and other items is surprising, not to mention the flexibility, convenience, simplicity, and most important of all, the bloom and brilliancy of the colors obtained.

The machine is installed under a positive guarantee that it will dye successfully direct colors, sulphur colors, and vat colors, the latter including the latest and most popular fast colors known. The machine is economical, both as to the floor space and power, and is simply and easily installed, and for its operation does not require skilled or high-priced labor, and attendance. It is simple and durable, and free from any complications.

In addition to their standard double tank, enclosed type machine, with specially designed reciprocating pump, the Perfection Dyeing Machine Company offer and build a single tank machine, with a cheap centrifugal pump, and not guaranteed except for a limited range of dyeing, and which does not include the latest and fastest vat dyes, and this type of machine, being much cheaper to build, and less efficient, is offered at a greatly reduced price from their standard machine and equipment.

The success of beam dyeing is entirely dependent upon having a properly designed beam. This in fact is the "heart of the machine," and without it, the system cannot be a success. The Perfection beam is so designed that the supporting slats or ribs can be alternately expanded and collapsed in contact with the yarn during the dyeing process, thus insuring an even and uniform dyeing through the yarn and free from slat marks, which will occur, particularly on light shades, if the slats are fixed in position, or simply collapsed. These and other important features the Perfection Dyeing Machine Company have protected by broad and basic patents.

Now, to mention some of the advantages of beam dyeing, we will first compare it with the long chain system. As previously explained, the yarn is wound on the patented beam on the warper, and carried direct to the dyeing machine. From the dyeing machine, it is carried direct to the slasher. By this process, we do away with winding, scalding, doubling, dye tubs, splitting, drying on cans, unwinding and beaming. The yarn is evenly and uniformly dyed, and all waste due to tangled ends and broken warps is avoided. The skilled labor of long chain beaming is eliminated. The carrying charges, or expense of having on hand a large stock and supply of long chain warps of various colors, ahead of requirements is avoided. Any particular pattern or warp requiring colors, can be wound and dyed and ready for the looms in ten to twenty hours, as compared with a set made from long chain, requiring several days. The floor space required is about 8 by 40 feet, and for four machines, about 30 by 40, which is much less than a long chain equipment and means a big item of saving and convenience.

Now as compared with the raw stock system, beam dyeing has numerous advantages. It is a well recognized fact that dyed raw stock cannot be worked successfully unless it is kept a sufficient time after being dyed to "age," or regain the natural moisture, and to overcome the changes in the natural fiber, incidental to dyeing and drying. This means that the dyed stock has to be baled and packed away in storage and large stocks carried ahead for requirements, which means idle capital and increased carrying charges, and hence can only be considered as "stock in process," and not in any sense "quick assets." It is not necessary to enumerate the extra trouble and expense, and waste, of manipulating and working raw stock cotton as compared to white cotton. The waste is very much greater and the production very much less. Even colored waste has to be sold at a greatly reduced price from white waste.

Every manufacturer knows the aversion that cotton mill help have to working with raw stock in the various departments, and that on this account, higher wages have to be paid, and in every instance a mill on white stock will have the preference over a mill with dyed raw stock.

To enumerate the advantages of beam dyeing over other systems, we mention the following:

First. The labor cost in the dressing room, such as beaming and dressing, is entirely eliminated. In one mill where they were using the long chain system, where beam dyeing was installed, they saved the expense of four long chain beamers at $2.25 per day, and other labor items in that department, amounting to a total of $10.00 to $12.00 a day, and through the entire mill, including the dye house, affected a saving of over $20.00 per day.

Second. The cost of labor in the dye house is very much less, the saving of course depending on each local condition.

Third. Quite a saving in dyestuff is made over raw stock.

Fourth. A saving in steam, water, and power.

Fifth. Saving in floor space.

Sixth. Large stocks of dyed warps, and raw stock, and the consequent carrying charges are eliminated.

Seventh. The time required for getting out any particular patterns and sets is limited to a few hours, as compared with several days by other systems, thus enabling orders to be filled quickly and with dispatch. There are other incidental advantages and features in favor of beam dyeing, but the principal ones have been mentioned, and in fact any practical manufacturer can easily comprehend what these advantages are, and the saving that will be affected.

Eugene S. Graves—I believe that the whole subject of package dyeing or mechanical dyeing in the wound condition is like a dog with a bad name, because of over enthusiastic statements by inventors. There is certainly a great deal to be said in favor of mechanical dyeing.

The paper states that these warps are dyed and put into the slasher in 2 1/2 hours. I know from experience that it takes a day and a half to dry a warp. It couldn't be dyed and dried in time stated in the paper, but I understand that the warps are taken wet. The slashing of wet yarn with the dry yarn is the cause of serious difficulties. The uneven tension from the wet yarn running with the dry causes bad weaving.

One would assume from the paper that it would be possible to dye all manner of colors on the machine, but I believe that anilin black, Turkey red, indigo, basic colors, diazotized and developed colors would have to be excluded. This narrows the range of colors down to a much smaller limit.

In getting out samples or in making up patterns, where only a few ends of colors are required, the beam naturally has to be of fair size in order to be economical in dyeing. If only a few ends are needed, a thousand pieces could be prepared with 40 pounds of yarn. The whole beam would have to be dyed and then the number of ends taken from that beam to make the particular number of pieces in question. As the rest of the beam is wet, it would have to stand to one side, and the yarn would in time become tender. I should think there would be a very serious difficulty there in getting out small orders or sample pieces by that method of dyeing.

The beams themselves must be quite complicated and expensive. I should think the item of expense would be large if the yarn had to be carried on beams.

Churchill Hungerford—I saw this machine in operation. It takes only 2 1/2 hours from the time they put the goods into the dyeing machine until it is going over the slasher. The gentleman who just spoke does not seem to understand that they have a system of drying which leaves the yarn somewhat moist, but in a condition which they consider is suitable for the slasher. This is done by turning compressed air on the inside of the beam under a pressure of 25 pounds. That blows the water out of the yarn. It is this particular feature that is not made quite clear by the paper, and which accounts for some of the gentleman's remarks. He seems to think the goods are wet. They are not; they are just a little moist, that is all.

Mr. Graves—I do understand perfectly that the beam, if it was taken directly to the machine wet, would weigh three or four hundred pounds more than it would if the excess water was blown out, but the point is that the yarn is not dry, it is still wet. I know we can by compressed air blow out a surprising amount of water, because I have tried the experiment myself, but the yarn is still wet. It would not be in condition to store, surely, and there is a serious difficulty there. Another thing that I do not understand is the matching of the shades. You know every dyeing is an experiment, and the dyer doesn't know what his shade is going to be.

Mr. Hungerford—I am sorry to say I cannot tell you. I saw the process for a few hours at one time and that is the extent of my knowledge. They did have some system but I don't remember what it was.

Charles T. Plunkett—A recent explanation of this machine states that a supplementary cylinder has been added, so that the dyed portion of warp, the beam containing the dyed warp, is run over this cylinder of about four feet in diameter, drying the yarn previous to its going into the sizing with the other yarns.

At a meeting of the Board of Governors the following gentlemen were appointed members of the National Council of Cotton Manufacturers, organized to represent the American Cotton Manufacturers' Association and the National Association of Cotton Manufacturers: Edwin F. Greene, ex-officio member; Albert G. Duncan, appointed for one year; Charles G. Plunkett, two years; Franklin W. Hobbs, three years; W. Frank Shove was appointed alternate for one year, William M. Butler for two years and William Amory for three years.

During the closing session, Charles T. Plunkett called attention to the opportunity of presenting before the American Society of Mechanical Engineers papers relating to the cotton industry. Two papers from each of the important branches of industry in the country are invited. E. W. Thomas, Lowell, Mass., is the secretary of the committee in charge of the textile section.

The attendance at the meeting was fully up to the average, and in point of interest and discussion of the papers, was better than usual.

A lack of any central meeting place or headquarters for the social features of the convention causes the members and guests to be more scattered than when the meetings are held in some hotel or in conjunction with the machinery exhibition.

The election of new officers resulted as follows:

President: Edwin Farnham Greene, Treas. Pacific Mills, Lawrence, Mass.

Vice-President: Albert Greene Duncan, Treas. Harmony Mills, Cohoes, N. Y.; George P. Grant, Jr., Treas. Grant Yarn Co., Fitchburg, Mass.

Directors for three years: Albert F.

Bemis, Pres. Bemis Bag Co., Boston. Mass.; Russell B. Lowe, Pres. Parkhill Mfg. Co., Fitchburg, Mass.; R. M. Miller, Jr., Pres. and Treas. Elizabeth Mills, Charlotte, N. C.

Director for two years: Grosvenor Ely, Treas. Ashland Cotton Co., Norwich, Conn.

New members were admitted at this session as follows:

For Active Membership: Wallace L. Ball, Asst. to Gen. Mgr. International Cotton Mill Co., 86 Worth St., New York, N. Y.; Albert H. Chamberlain, Treas. Arlington Mills, 78 Chauncy St., Boston, Mass.; Robert J. Edwards, Treas. Bates Manufacturing Co., 60 Congress St., Boston, Mass.; Raymond L. Foster, Chief Engineer Fitchburg Yarn Co., Fitchburg, Mass.; H. Chester Greenlaw, Supt. Nottingham Mill, B. B. and R. Knight, Providence, R. I.; John E. Paige, Treas. Central Mills Co., Southbridge, Mass.; Robert W. Prentice, Treas. Hoosac Cotton Mills, North Adams, Mass.; Henry P. Hunter, Supt. Boott Mills, Lowell, Mass.

For Associate Membership: Benjamin Helm Bristow Draper, Draper Company, Hopedale, Mass.; Robert A. Leeson, Treas. Commercial Winding Co., Boston, Mass.; Charles J. O'Malley, Pres. O'Malley Advertising and Selling Co., 125 Summer St., Boston, Mass.; James S. Turner, Prop. J. S. Turner Belt Mfg. Co., Lowell, Mass.; George T. Leigh, Vice-Pres. John Leigh Corporation, Boston.

Owing to lack of space we are obliged to postpone until the next issue the papers on Cooperation Among Manufacturers, by Charles H. Fish; Economy of Superheated Steam, by S. Rosenzweig; Cotton Mill Accounts, by Joel Hunter; Waste of Material Used in Cotton Manufacturing, by Andrew Fisher, Jr.

The following members and guests were registered:

CONNECTICUT

Robert William Boya, Killingly.
Arthur H. Gulliver, Norwich.
William H. Buckley, Baltic.
Walter B. Knight, Willimantic.
W. Irving Bullard, Danielson.
George A. Vaughan, Putnam.
William Richardson, Putnam.

DELAWARE

Earl S. Jenckes, Wilmington.

GEORGIA

Frederick B. Gordon, Columbus.

ILLINOIS

Ralph E. McCausland, Rockford.

MAINE

W. K. Sanborn, West Kennebunk.
Philip Dana, Westbrook.
Ernest L. Morrill, Saco.
Arthur N. Hersom, Augusta.
Russell W. Eaton, Brunswick.
Edmund E. Blake, Biddeford.
James Strang, Biddeford.
Pardon N. Dexter, South Berwick.
E. Payson Gibbs, Biddeford.
T. B. Stevenson, Augusta.

MARYLAND

William G. Nichols, Baltimore.

MASSACHUSETTS

W. W. White, Worcester.
Joel M. Barnes, Boston.
Frederick H. Bishop, Boston.
Lawrence M. Keeler, Whitinsville.
Nathaniel Kinsman, Jr., Boston.
Edwin H. Marble, Worcester.
Henry March, Boston.
George F. Steele, Boston.
John K. Whittier, Lowell.
Charles B. Burleigh, Boston.
Leonard W. Cronkhite, Boston.
E. T. Fowler, Westfield.
Sidney B. Paine, Boston.
E. Kent Swift, Whitinsville.
W. S. Pepperell, Hopedale.
A. H. Garside, New Bedford.
E. T. Lyle, Boston.
W. E. Hatch, New Bedford.
A. S. Fuller, Boston.
C. D. Park.
W. C. Elliott, Boston.
E. H. Bacon, Boston.
E. L. Merrow, Fall River.
Wm. H. Sherman, Lawrence.
H. J. Jackson, Boston.
Robert A. Leeson, Boston.
M. F. Field, Dorchester.
F. H. Childs, Boston.
J. H. Windle, Boston.
David Brown, Lawrence.
E. E. Palmer, Boston.
Daniel J. Danker, Boston.
J. S. Henderson, Boston.
Henry G. Lord, Boston.
Frank L. Nagle, Boston.
Samuel S. Dale, Boston.
Albert Bemis, Boston.
Charles H. Fish, Boston.
John P. Marston, Boston.
Robert W. Neff, Boston.
Walter E. Parker, Lawrence.
C. J. H. Woodbury, Lynn.
Charles F. Young, Boston.
William Amory, Boston.
Nathaniel F. Ayer, Boston.
J. W. Bailey, Fall River.
Lewis E. Barnes, Methuen.
Edwin N. Bartlett, North Oxford.
J. B. Bolton, Lawrence.
Robert Burgess, Boston.
Thomas Burke, Lowell.
John L. Burton, New Bedford.
Charles B. Chase, Fall River.
Jno. H. C. Church, Housatonic.
Frank B. Comins, Boston.
Richard Cowell, Fall River.
William W. Crosby, Boston.
Andrew J. Currier, New Bedford.
John T. Dawson, Fall River.
James F. Dorsey, Boston.
Eben S. Draper, Hopedale.
John A. Fernley, New Bedford.
William Firth, president, Boston.
Arthur C. Freeman, Lawrence.
Arnold C. Gardner, New Bedford.
George P. Grant, Jr., Fitchburg.
Edwin Farnham Greene, Boston.
S. Harold Greene, Boston.
Albert G. Smith, Fitchburg.
Irving Southworth, Lawrence.
John Sullivan, New Bedford.
Earl A. Thissell, Lowell.
Albert W. Thompson, Lowell.
Charles R. Thomson, Adams.
George W. Towne, North Andover.
Robert S. Wallace, Fitchburg.
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Ralph E. Thomson, Fitchburg.
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Harold F. Sherman, Worcester.
William F. Sherman, Boston.
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Samuel Stewart, Bondville.
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Edward W. Thomas, Lowell.
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John R. Mitchell, New York City.
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George W. Neville, president, New New York Cotton Exchange, New York.
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J. B. Barrett and E. S. Graves, Providence.
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William Halliwell, Pawtucket.
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Alexander S. West, Providence.
Arnold Schaer, Warren.
John E. Kendrick, Providence.
L. W. Campbell, Woonsocket.
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Dwight Seabury, Pawtucket.
Christopher J. Shambow, Woonsocket.
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J. Henry Thorpe, Providence.
William Halliwell, Pawtucket.
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Joseph Mercer, Providence.
Robert B. Meikle, Westerly.
Albert H. Goff, Pawtucket.
Charles R. Makepeace, Providence.
Frederick W. Howe, Providence.
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William H. Harriss, Pawtucket.
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SPUN SILK YARN NUMBERS

BY JAMES STRAND

Spun silks in England are invariably numbered by the same unit as cotton (840 yds. per lb.). One important practical distinction is that in the case of folded yarns the number used is that of the hanks per pound in the folded state. Thus 2-fold 60s silk is made by joining two threads of single 120s and not by two threads of single 60s as in cotton.

If you want to know why a yarn produced almost entirely upon worsted-type machinery is numbered in accordance with the cotton scale, I would point out that originally all silk waste was chopped into lengths of an inch or two long and carded and spun on cotton-type machinery. It was apparently about 1830 that waste was first spun in England without being chopped. About 1840 use of the throstle frame and the long ratch extended, and in the fifties and sixties became general. Waste silk was hand spun in a factory in Kendal about 1760 and outside Lancaster there is a mill that has been in continuous operation since 1792 and that still produces short-spun, that is, cotton-type yarn, from chopped waste, as well as long spun or worsted-type yarn.

The Schappe silk yarns of all Continental countries are numbered upon the metric system and Italian. Swiss and French makes are regularly bought here, largely in the form of singles, or of 2-fold 60s. For common purposes the metric 200/2 is taken as equivalent to 60/2 English. The reason why the Continentals use the metric count is fairly plain. Waste silk was hand spun on the Continent doubtless in the 16th century and certainly in the 17th and 18th, but its development as a factory industry is one mainly of the last half century. A mill opened in 1822 at Basle is said to have been the first to begin the business in Europe. As late as 1861 there was said to be "practically only one silk spinning firm" and that in France.

The English is thus the older unit and there is the more reason for preserving it because the greater part of spun silk is used in conjunction with cotton or with worsted and by men to whom the meter and kilogram are unfamiliar dimensions. By local custom silk noil yarns in England are numbered by the worsted (or 560 yd.) enumerator. The production is unimportant and the example is in line with that of the woolen spinners. The latter takes worsted waste and makes carded woolen yarn out of them, applying woolen numbers to his product. The noil spinner takes the silk spinner's noils, makes a thick yarn of them and applies the number most familiar to the district in which he works.

Correspondence and Notes

UPON TEXTILE TOPICS AT HOME AND ABROAD

IMITATION ASTRAKHAN

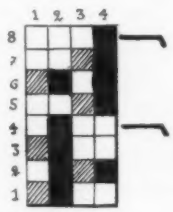
BY ROBERT DANTZER

[Translated from the French by the Editor of the Textile World Record.]

Genuine astrakhan fur is obtained from stillborn lambs, the skins being specially prepared in Russia and Persia. The very high price of the genuine article has stimulated efforts to produce imitations.

Fig. 1 is a weave for a silk plush, Fig. 2 being a sectional view of the fabric showing

FIG. 1.



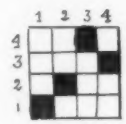


FIG. 2.

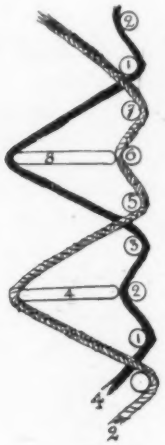


FIG. 4.

the pile. This class of goods was very popular at the beginning of the 19th century, the fabric being made with 170 threads to the inch and warped 1 single organzine, 1 triple organzine to form the pile, the pile yarn having four times the twist of ordinary organzine. The rods with rounded edges and 5/8 inch high were used. The hard twist of the pile thread gave the fabric a curly appearance resembling astrakhan. Since that time manufacturers have succeeded in finishing certain kinds of wool plush by a process called "astrakhanizing" to give the appearance of the astrakhan fur.

Fig. 3 is a sample of astrakhanized wool plush, the weave being shown at Fig. 4. The warp of this fabric is 2/28s cotton with 28 threads per inch finished. The filling is No. 2 (English worsted count) carded mohair with 22 picks to the inch. The warp is woven undyed, the filling being dyed a brown shade. After weaving this fabric is passed through successive baths of soap and soda at 2° Be., the temperature not exceed-

FIG 3

ing 76° F. After this scouring process the cloth is well fulled to increase the solidity. It is then rinsed and run through a solution consisting of 50 parts water and 10 parts fuller's earth. The goods are left from 2 to 3 hours in this solution, then rinsed and

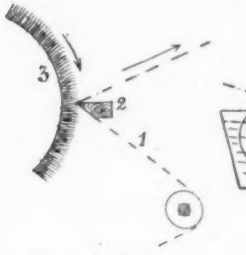


FIG. 5.

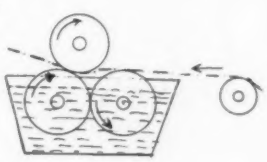


FIG 6.

hydro-extracted. The cloth is then napped on both sides and finally napped crossways of the piece. The pieces, still damp, are wound on wooden rollers and left for 12 hours. The fabric is then beaten with rods on the back, face down, to raise the pile. The pieces are then hung in a hot chamber in such a way as not to disturb the pile.

After drying the cloth is passed over a brush, Fig. 5, to raise the nap. The direction of the cloth under tension is suddenly reversed by being drawn around the edge of a rod, 2, as shown, at which point it comes in contact with the brush, 3. The fabric is steamed in the open width and cropped on

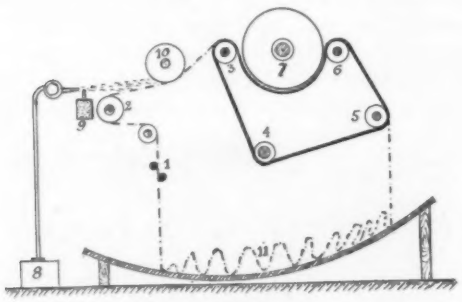


FIG. 7

a shearing machine to equalize the pile. The goods are then dyed black on the face by means of printing rollers, Fig. 6. As wool or mohair has a strong affinity for dyestuffs this process presents no special difficulty.

a pressure of two atmospheres. The goods are then allowed to cool and after being opened up are dried in a tentering machine. A fabric finished in this way is hard to handle and it is necessary to impart luster to the pile by a process called "varnishing."

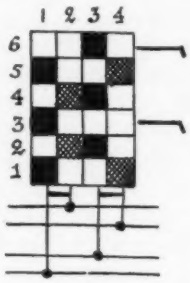


FIG. 8.

The solution used for this process is prepared as follows:

Five parts by weight of linseed oil is boiled in 50 parts of water in a tub having a false bottom; 5 parts of fleawort is boiled in the same way in 50 parts of water. At the end of half an hour the two solutions are

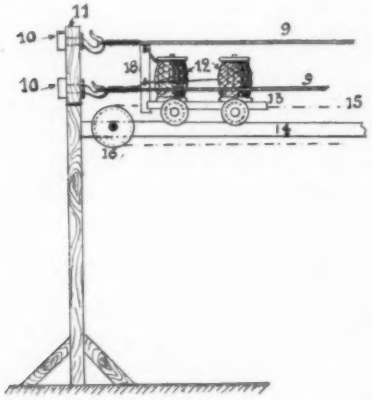


FIG. 9.

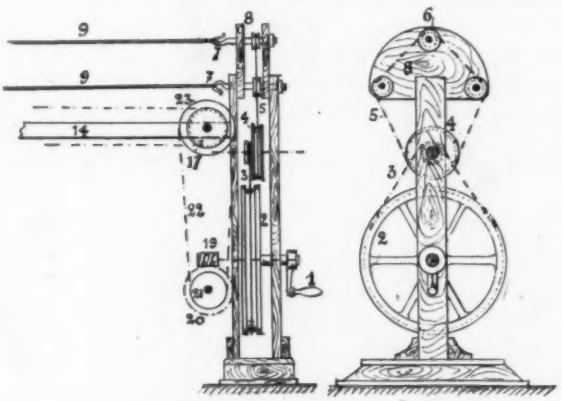


FIG. 10.

After rinsing, the piece is folded irregularly by crumpling in every direction. It is then sewed up in a linen sack which is bound tightly by means of long cords, first lengthways and then crossways, so as to subject the material to as great a pressure as possible. The sack is then immersed in boiling water for seven to eight hours. The same result is obtained by steaming the sack of goods in a closed kier for three hours at

mixed and run through a sieve. Five parts of starch is added to the mixture, which forms a gummy mass after cooling; 7 1/2 parts of glycerine is added and the solution boiled for 1/2 an hour. It is then made syrupy by adding a small quantity of boiling water; a small quantity of boric acid is added to prevent fermentation. This syrup is diluted with five times its volume of boiling water. The mixture is applied to the

fabric by means of an atomizer, Fig. 7. The fabric passes between the bars, 1, over the roller, 2, being drawn by the roller, 10, which is covered with flannel and revolves at a fairly high speed. Between these two rollers the fabric receives the spray of pulverized varnish from the atomizer, 8 and 9. The cloth then passes over an endless felt apron which runs over the rollers, 3, 4, 5 and 6, the cloth in its passage being pressed

FIG. 11.

against the roller, 7, which is heated by steam and which also revolves at a fairly high speed. The action of this roller on the varnish imparts the luster to the fabric. The process is completed by dyeing.

Fig. 8 is the weave of a mohair plush fabric of which the sample, B, can be seen at

FIG 22.

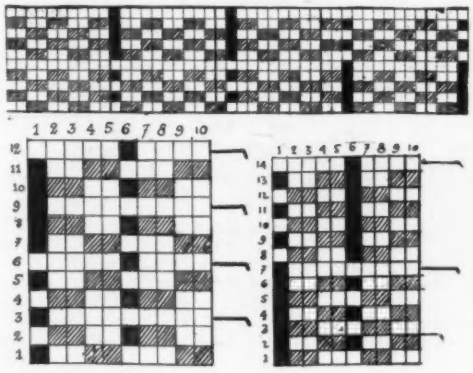


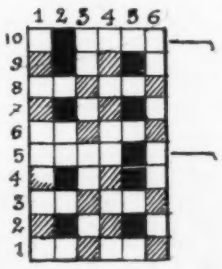
FIG. 15 FIG 17

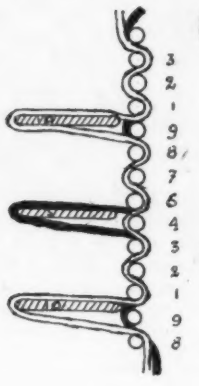
the Boston office. The ground warp threads, 2 and 4, Fig. 8, is 10s cotton, 3 ends being woven as one. The pile warp is 2/50s mohair, 2 threads being woven as one. There are 38 warp threads to the inch; 36 picks and 18 rods to the inch, the filling being single 4s cotton. This fabric is colored after being astrakhanized. As the wool has greater affinity for the dyestuff than the cotton has, the dyeing process is begun at a low temperature and the bath heated gradually. Logwood is preferred for the black, the goods being mordanted with 7 per cent.

FIG. 12.

copperas and a small quantity of oxalic acid. The mohair pile is sometimes curled for this finish. A thickener of British gum is applied. The pile is then brushed with a

FIG. 13.





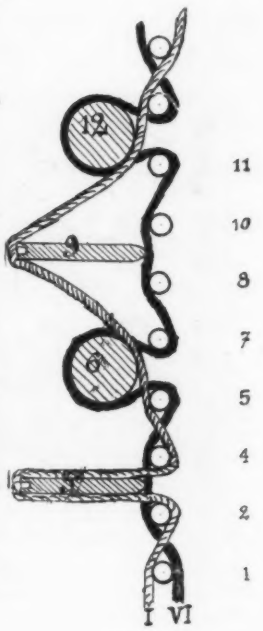


FIG. 14. FIG. 16.

long brush so as to give an irregular appearance. The piece is then dried, steamed at a pressure of 1/2 atmosphere, rinsed and then dried. The process patented by Anton & Lehmann, French patent No. 213,320, May 8, 1891, is based on the direct action of

steam under pressure on the pile, which is pressed against a metal plate on which is engraved the design to be reproduced. The steam forces the pile into the depressions in the plate and fixes the pattern.

The most perfect imitations of astrakhan

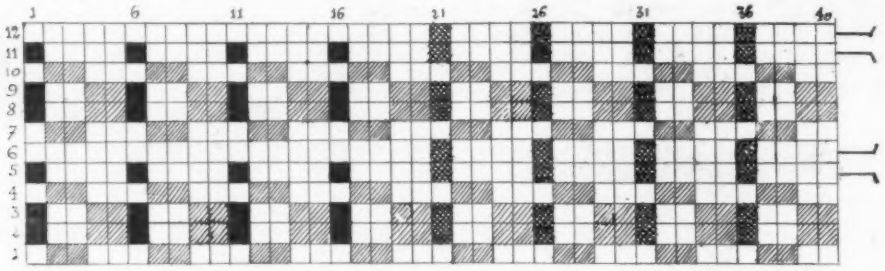


FIG 19.

are obtained by means of plush weaves. These fabrics are made with two sets of warp, one for the ground and the other for the pile, the warp being run over two separate beams. The ground warp is woven with a high tension while the pile warp is

to suit the effect desired in the goods, the height and closeness of the pile varying with the different grades of goods. The astrakhan pile can be cut or left in curls. Sometimes part of the pile is cut and the remainder left uncut. The curly effect which

gives to plush the remarkable appearance of the genuine astrakhan fur, is obtained by preparing the yarn in a special way before weaving. The yarn is first wound around a cord called the core, forming in this condition a sort of gimp similar to passementerie

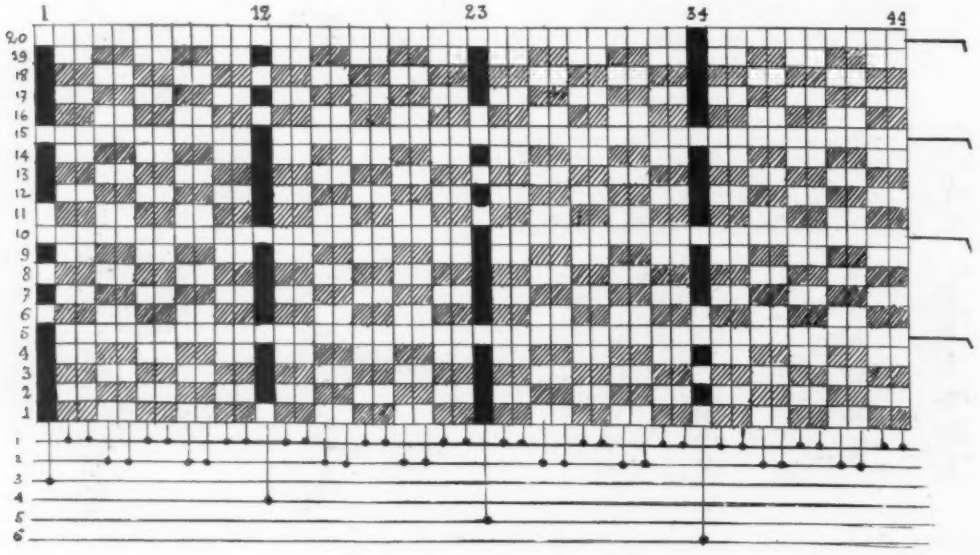


FIG. 21.

subjected alternately to a forward and backward movement. Two rollers worked alternately are required for the pile warp. The ground which is of cotton is woven with a plain weave, the pile being raised by the aid of thin iron plates. The pile threads are set

used for ornamenting the edges of veilings. The pile yarn consists of a number of mohair or luster wool fibers having a very long staple, the group of fibers being sufficiently large to form the pile effect desired. This mohair or luster wool yarn is wound around

the cord by the apparatus, Figs. 9 and 10, used for making gimp for passementerie. The winding of the mohair yarn around the cord, 9, Fig. 9, presents no special difficulty. The length of the cord, 9, depends on the space available for carrying on the operation. In a plant which I visited at Tourcoing some years ago the cord was 300 feet long. As 3 or 4 cords are operated at once the work is carried on rapidly, but it is evident that for a very large production the work could be done to better advantage by a special twisting machine.

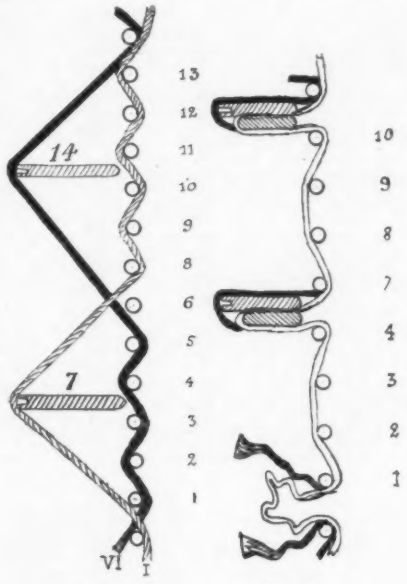


FIG. 18. FIG. 20.

The pile yarn being attached to each end of the cord, 9, the latter is rapidly covered with spirals, after which the cord is taken from the hooks. The cord, covered with the pile yarn, is immersed in boiling water for about two hours, the process being sometimes expedited by steaming the yarn, as steam has a more energetic action than boiling water. The cord still covered with the wool yarn is hydro-extracted and then thoroughly dried. The mohair yarn is then unwound from the cord, as shown at Fig. 11. Each end of the cord is attached to a hook similar to the one shown at 10, Fig. 9. After being brought under tension the yarn is easily unwound from the cord by revolving hooks. This unwinding process appears to destroy the curl, but as soon as the yarn is left to itself for a certain distance the curl reappears, as shown at Fig. 12. Manufacturers have sought to produce the curl effect in a more rapid manner; the Pereyron machine (French patent No. 168,967, May 16, 1885) represents one of these attempts. The yarn on this machine is wound on a bobbin mounted on a revolving plate. This plate is moved around a horizontal mandrel, around which the yarn coming from the bobbin is wound. These spirals as they are formed are moved along by a vibrating rod and are pressed between two friction rollers, each heated by a gas flame. The combined action of the pressure, twist, friction and heat imparts the curl to the yarn.

Fig. 13 is an astrakhan weave, the section of the fabric being shown at Fig. 14. This weave requires 4 harness, 2 for the ground thread and 2 for the pile. One beam is required for the ground warp and 2 for the pile.

Fig. 15 shows an astrakhan weave, a section of the fabric being shown at Fig. 16.

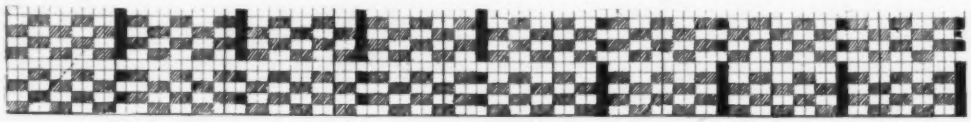


FIG. 24

This pattern is made with one cut pile, one curled pile, and is woven 2 ground picks, 1 pile rod. It requires 3 beams and 4 harness.

Fig. 17 shows the weave of an astrakhan fabric of which a section is shown at Fig. 18. It is woven 6 picks, 1 pile rod, the ground being a ribbed weave to give an effect to the fabric.

Ths astrakhan weave at Fig. 19 is made with a basket weave for the ground. It is

dressed 4 ground threads, 1 pile thread and woven 4 picks, 1 rod for an uncut pile and 1 rod for a cut pile. The pattern shows lines of uncut loops afternating with lines of cut pile. The section of this fabric is shown at Fig. 20.

In the weave shown at Fig. 21 the 4 pile threads are stitched in 4-leaf satin order. It

FIG. 23

is, therefore, necessary to use 4 beams for the pile warp and an additional beam for the ground warp. The warp is dressed 5 double threads for the ground and one heavy thread for the pile.

Fig. 22 is an astrakhan weave in which the

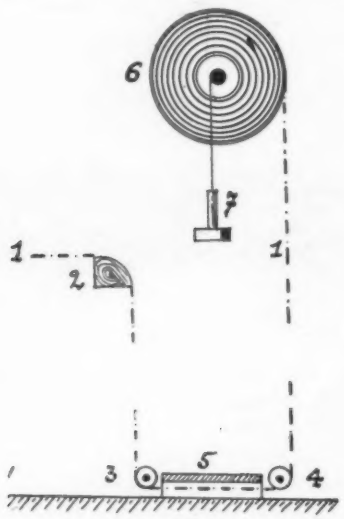


FIG. 26

pile is woven 2 by 2, 2 beams being required. Fig. 23 is a sample of the astrakhan woven with this weave. This sample is made with a cut pile throughout and is woven with 7 rods to the inch.

Fig. 24 is similar to Fig. 23 except that the pile warp is stitched in groups of 4 threads. Fig. 25 is made with one rod on an

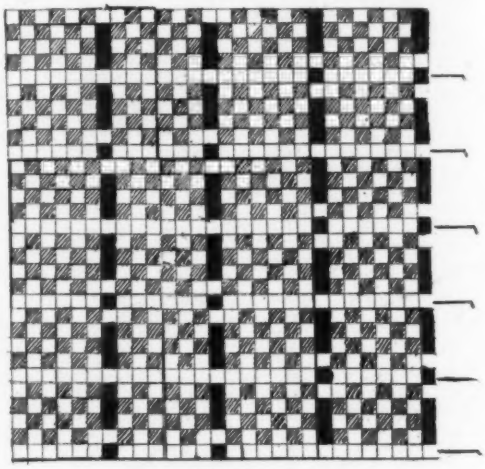


FIG. 25.

uncut pile and 2 rods for a cut pile, the pile warp being stitched in alternate groups of 2 threads offsetting each other.

The astrakhan fabrics are generally woven by hand, the process presenting no special difficulty. In the neighborhood of Amiens a semi-automatic loom is used, the invention of M. Screpel. The shuttle is thrown by an

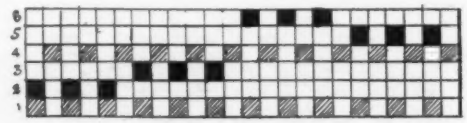


FIG. 27.

over pick motion, the rod being inserted by hand. The loom stops automatically for the passage of the rod.

Fig. 26 shows a method by which the cloth is drawn from the loom. Passing over the breast beam, 2, the cloth is carried by means of the rollers, 3 and 4, under the platform, 5, on which the weaver stands. The piece is wound on the roller, 6, by means of the weight, 7.

Imitation astrakhan can also be made by forming the filling into a pile. Fig. 27 shows

the weave for this class of goods which at one time were very popular. The ground picks and the ground filling, 1 and 4, are cotton. The pile picks, 2, 3, 5 and 6, are mohair yarn curled by the process already described. The pile is cut on a table after

FIG. 28.

weaving in the same way that cotton velvet is cut. Fig. 28 shows a section of the fabric after cutting. As will be understood, this construction is not suited for the uncut pile. This method of manufacturing imitation astrakhan, while it requires more material, has the advantage of being suited for a pick and pick loom without special apparatus.

Fig. 29 illustrates the Tremblay method of

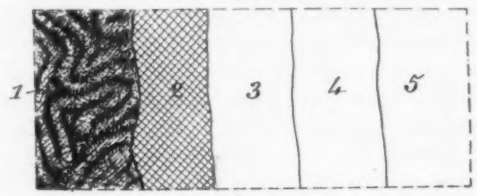


FIG. 29.

manufacturing imitation plush (French patent 389,427, April 18, 1908). Silk chenille, 1, is sewed on a band of tulle, 2, in winding form, the edges being fastened together. An opaque fabric, 3, is sewed on the back of the tulle, 2, to give the necessary stiffness. A stitching of silk satin, 5, is applied to the back of the cloth, 3, by means of a thin coating of gutta percha, 4. The process is finished by passing the material over a hot iron plate which unites the silk satin to the astrakhan, making one solid fabric.

The shipments of worsted machinery from Leeds (Eng.) to the United States for 1911 amounted to $45,517, against $103,321 in 1910. Other textile machinery, including flax and jute spinning machinery, silk machinery, etc., in 1911 was $48,810, and in 1910, $58,828.

ENGLISH NOTES

By Our Regular Correspondent

A chance discovery in a diary of 1844 brings to light an item interesting to those who are working for a cheaper registration of textile designs. In the year named the calico printers of England presented to Emerson Tennant, M. P., 3,000 ounces of plate in gratitude for his exertions in passing the Copyrights and Design Act. The cheapening of registration in England showed large results immediately, for in the five months previous to the passing of the Act only 53 designs for carpets, silks, shawls and paper hangings were placed on the register. In the five months following the Act the number registered was 425. Printed designs became registrable for the first time in 1844 when 2,356 were protected within four months and three weeks. Calico printing would be almost an impossible trade without facilities for cheap and prompt registration.

* * *

The comparisons that are always being made between the positions of textile industry in England and America do not as a rule give too much attention to the influence of the respective financial systems of the countries. The influence is real enough and some of its work in practice can be illustrated by the words of a Bradfordian now engaged in the wool trade in New York. When money was tight in England and the bank was pressing for a reduction of the overdraft, he was ordinarily able to lighten his commitments. By going round the Exchange first to one man and then to another and agreeing to accept a cent a pound less than market price he could make sure of selling a pretty large bulk in a number of separate parcels. He added with feeling that the case is quite different in New York: "Offer the stuff at five cents down, or offer it at eight or ten cents down, and still the people will not buy. The reason — ? . . . Because the trade is all in the same box. Everybody is short at once. All are sellers and there are no buyers. That is how we get our panics." If there is a trace of exaggeration in the statement it still agrees in

broad substance with the experience of the men in all textile lines who are in closest touch with America. What one and all miss in their American dealings is the solid substratum of regular business which goes on here in bad seasons and in good ones and provides us with what Yorkshire prefers to call "a steady going-on." Wool men, yarn men and cloth men are unanimous on the last-named point and they attribute the fact partly to an eager and speculative temperament, but more to the difference in systems of banking.

* * *

Card room workers are paid on a less generous scale than operative spinners in Lancashire and their respective unions do not see eye to eye in the matter of the so-called "bad-spinning" strikes. Spinning operatives are paid piece rates in accordance with the well known uniform price lists and thus they have an interest in maintaining a full output. If the mixture supplied them from the cards is deficient in spinning quality and the cause of a large number of breakages, production and spinners' wages suffer. Mill profits may suffer also or may not. If the manager can save enough on cotton to compensate for the lowered output, and if he can further content customers with a generally inferior quality of yarn, it is possible for the mill to make profit while the operatives lose wages. The occurrence is possible and there are managers who are reputed to trade on the possibility, but there are important factors hindering the systematic adoption of the principle. The yarn that is worst to spin is, on the whole, also the worst to sell, and for reasons separate altogether from wages managers at large are anxious to select the raw stock that will do the work properly. The historic Brooklands Agreement provided machinery for settling disputes arising from alleged bad spinning and has in point of fact settled a great number. However, the leaders of the operatives have insisted that certain parties took undue advantage of the opportunities of delay afforded under the Agreement and suspended settlement for months of questions that could be settled with goodwill in a week. The spinning operatives accordingly abrogated the bad spinning clauses of the Brooklands Agreement and put some 26 mills on notice of strike. This last action is distasteful to the Card Room Amalgamation, for its members suffer from disputes in which they have no part. The employers are incensed by the intimidation of the Operative Spinners and some of them are driven to shelter competitors whose methods and tactics they do not voluntarily endorse. There is a probability that in the end the whole difficulty will be smoothed out and aside from purely local and personal considerations the affair stands as an instance of the trouble liable to accrue from working a uniform piece-work system in cunjunction with a trade union of great strength.

* * *

Stockinette astrakhans had a considerable run in this country some twenty years ago and were largely employed for the backs of kid gloves for winter. A number of machines were put down in Huddersfield and neighboring places, but after the trade had departed most of these were dispersed. Woven astrakhans with a cut or a loop pile are a regular article in some Yorkshire mills and profitable prices are understood to be made for the white and cream goods used for trimming outdoor garments for babies. The material is used in black for cuffs and collars for overcoats and there are more unlikely chances than that we are again approaching use of the same goods for cloaks, muffs and stoles. The fashion for silk sealskin may easily pave the way for a development of considerable interest to users of mohair. The making of thick yarns for this class of trade is somewhat of a specialty in Bradford, where a great deal of mohair is received and sorted into qualities suitable for purposes of all kinds. The fine hair goes for dress goods and the shorter, coarser and less lustrous for braids. There are spindles that run year in and year out to make yarn for the German braid and skirt-edging looms and there is always a large bulk of material on hand suitable for counts like 6s.

Almost an exaggerated secrecy prevails over the uniform system of costing that has been adopted by the Fine Cloth Manufacturers' Association, of Huddersfield and environs. Members are pledged not to divulge details, but while keeping strictly to their word some of them are not restrained from hinting their own doubts as to the policy of interference in each others' affairs. It is certain that some of the members, all of whom are makers of worsteds of a high grade, were only enticed into membership by the prospect of retaining their absolute liberty as individuals and equally certain that others are feeling need for caution. As well as can be learned, the theory of the system is that if you perform this or that operation at all it must cost you at least a certain sum specified and made the basis of the uniform scale of prices. The Association includes manufacturers of many sorts and sizes, some with thirty or forty looms and some with ten times as many, some doing the confining trade making a piece or two to the pattern and others with their own spinning plants making plainer goods in contract quantities. It is one of the latter who says that he would simply be set down as a liar were he to name to some other members the costs at which he regularly works. The uniform system has a perceptible tendency to tie down the ablest man to the selling prices of the less able and, if persisted in, this is destined to produce acute discontent. The list is of course graded and—as always happens—the prices at one end of the scale are in closer consonance with actuality than at the other. A story that is being passed round the Association relates to a cloth which would come in at the end of the scale. It was observed to its manufacturer that the price ought to be higher in order to agree exactly with the list. The reply was emphatic: "If I could run my mill on that cloth alone and sell it at 25 cents a yard less than your list, the year would be the very best we ever had." It remains in fairness to say that the man palpably could not run his mill on that fabric alone and also that the standard prices are not all so favorable. Wool has gone up and in itself that consideration would justify an advance in the prices of Scotch tweeds, but it is perhaps conceivable that the collusion of Yorkshire manufacturers to put up the prices of fine worsteds has some influence on the minds of the Scottish manufacturers who are now talking of 8-12 cents a yard advance upon their tweeds.

One hundred years ago Benjamin Law set up in Batley two rag-pulling machines and thus founded the trade in shoddy that has grown to such proportions in Dewsbury, Batley and Ossett. There are rumors of earlier beginnings in Yorkshire notably in Brighouse, and in 1801 three Glaswegians patented a rag-pulling machine. But from 1913 may be dated the rag trade of the Dewsbury district, a trade of such dimensions that "scarcely a man discards his stockings in Egypt, his overcoat in Japan, or his trousers in the United States who is not somehow or other contributing to the commerce of Dewsbury." This is the local member's picturesque version of the facts and is not wholly an unjust one. The centenary might seem to deserve a formal commemoration, but it is doubtful whether it will get more than incidental honors in connection with the new accession of Dewsbury to the rank of a county borough. Yorkshiremen are not a demonstrative people and the rag business on which the heavy woolen district has thriven is regarded more in the utilitarian than the sentimental light. Even in Dewsbury there are manufacturers who have done their best to avoid using rags, and one of them is credited with saying that it would not matter to him were Dewsbury never to receive a bale of rags again. The use of rags began in the old carded trade in blue cloths, pilots, flushings and so on. This original use still survives in the meltons, fearnoughts, presidents and beavers made nowadays with cotton warps for exportation and in army cloths. The employment of rags in the tweed trade came at a later date and tweeds for suits, costumes and overcoats must now be considerably the more important department. A question that will perhaps never be settled is whether addiction to rags has not

after all been a mistake; whether if Yorkshiremen had clung to short wools and to noils and worsted waste they would not have been better off. It is granted that rags must be used by manufacturers somewhere. The puzzle is to determine who fare best, those who use them or those who leave them alone. The rag manufacturing industry has not been highly lucrative to those engaged in it and the business in higher-grade woolens has had only fluctuating fortunes. Worsteds killed the plain pure woolen trade in one direction. Low grade woolens have interfered considerably at times with trade in the better class of tweeds. For some time past fortune has favored the sale of the best woolens and money makers of low goods have striven to get into a medium class of trade in which rag wool is rather an incident than a main material. A plausible solution to the matter is offered by those who say that two ferocious a competition is disadvantageous to any branch and it is unquestionable that in the low-grade woolen business competition has been ravenously keen. Profits have come on turnover rather than on individual transactions and have gone to those who could lift the largest weights of raw material and run their mills day and night.

The quantity of cotton consumed in the United States during the year ending August, 1911, was 4,704,978 bales.

A HAND BOOK OF WEAVES

By G. H. OELSNER, Director of the Weaving School at Werdau.

Translated and Revised by Samuel S. Dale

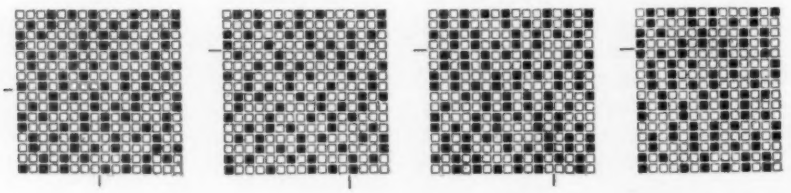
This Series began in July, 1911

RIB CREPE

This form results from the removal of points at regular intervals from a $\frac{2}{2}$ or $\frac{3}{3}$ rib weave. When the risers are removed the filling floats over three warp threads, Figs. 1109 to 1115.

Fig. 1109 ..... 8 warp, 8 filling
Fig. 1110 ..... 12 warp, 12 filling
Fig. 1111 ..... 12 warp, 12 filling

FIG. 1109. FIG. 1110. FIG. 1111. FIG. 1112.



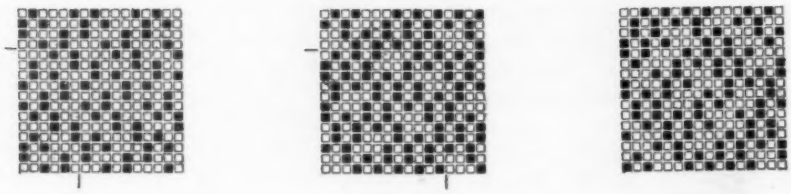


FIG. 1113. FIG. 1114. FIG. 1115.

Fig. 1112 ..... 14 warp, 12 filling
Fig. 1113 ..... 6 warp, 12 filling
Fig. 1114 ..... 12 warp, 12 filling
Fig. 1115 ..... 16 warp, 16 filling

CREPE BY DRAFTING ONE WEAVE OVER ANOTHER

Crepe effects can be obtained by blending weaves in the same drafts. A weave is first sketched and then another is drafted over it without removing any of the risers of the first. For example one twill is set over another, the two running in opposite directions; or a satin may be sketched on a satin, the two weaves having a different number of threads. This method is used but little owing to the small number of good effects obtainable.

Fig. 1116 ..... 8 warp, 8 filling

(Copyright, 1913, by Samuel S. Dale.)

FIG. 1116.

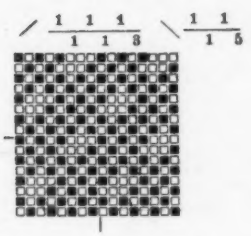
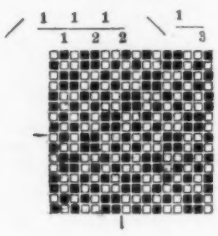


FIG. 1117.



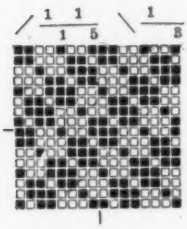


FIG. 1118.

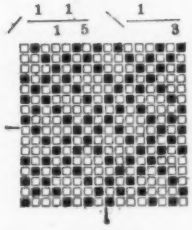


FIG. 1119.

FIG. 1120.

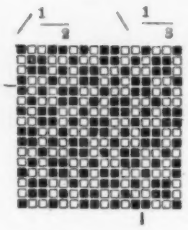


FIG. 1121

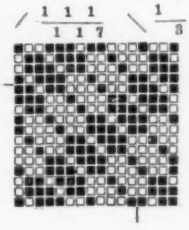
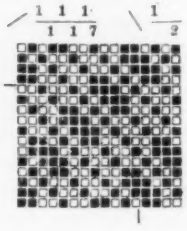


FIG. 1122.



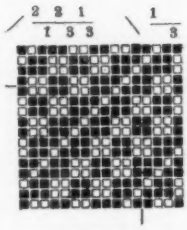


FIG. 1123.

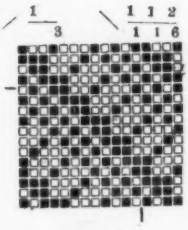


FIG. 1124.

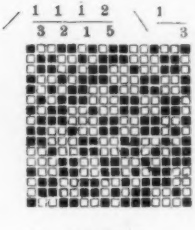
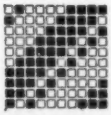


FIG 1125.

FIG. 1131.

FIG. 1133.

FIG. 1135.



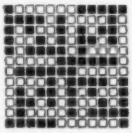


FIG. 1132.

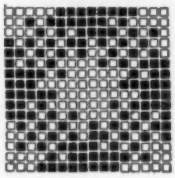


FIG. 1134.

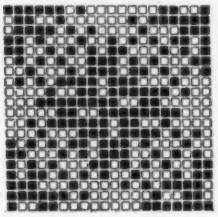


FIG 1136.

Fig. 1117 ..... 8 warp, 8 filling
Fig. 1118 ..... 8 warp, 8 filling
Fig. 1119 ..... 8 warp, 8 filling
Fig. 1120 ..... 12 warp, 12 filling
Fig. 1121 ..... 12 warp, 12 filling
Fig. 1122 ..... 12 warp, 12 filling
Fig. 1123 ..... 12 warp, 12 filling
Fig. 1124 ..... 12 warp, 12 filling
Fig. 1125 ..... 16 warp, 16 filling

CREPE BY DRAFTING A WEAVE IN FOUR SQUARES

This method consists in drafting a weave on alternate warp and filling threads, then turning the foundation weave draft around quarter way and transferring it in this position to the new draft, repeating the process for the two remaining sides. Each of the two sets of alternate warp and filling threads receives two of the transferred weaves. This method is illustrated at Figs. 1126 to 1130. Fig. 1130 is derived from a $^{2}\!/_{2}$ twill. This twill is transferred to the first set of alternate warp and filling threads of the draft, Fig. 1126. The 4-leaf twill is next turned one-quarter around and transferred to the second set of alternate warp and filling threads of Fig. 1127. Another quarter turn and a transfer gives the twill shown at Fig. 1128. The twill is again turned one-quarter around and transferred to Fig. 1129. These transfers are here shown on four separate drafts, Figs. 1126, 1127, 1128 and 1129, for the sake of clearness. They are in fact transferred to the same draft, making the crepe weave shown at Fig. 1130. The operation is made easier by using ink of a different color for each transfer.

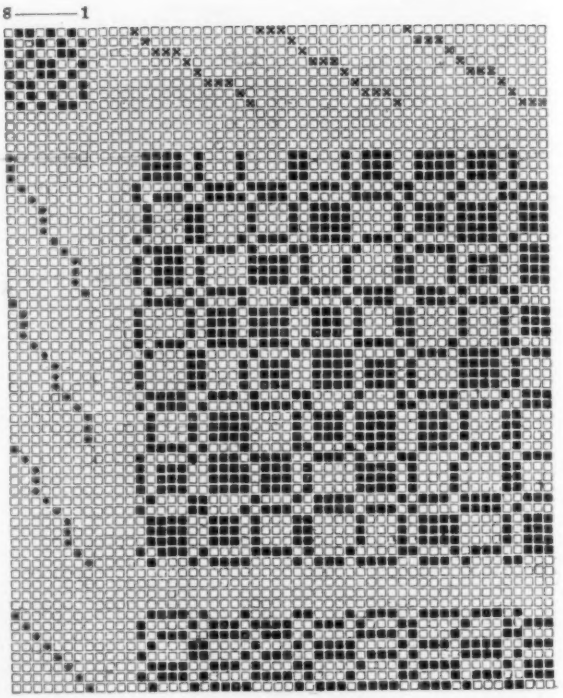


FIG 1094.

FIG. 1126. FIG. 1127. FIG. 1128. FIG. 1129 FIG. 1130.

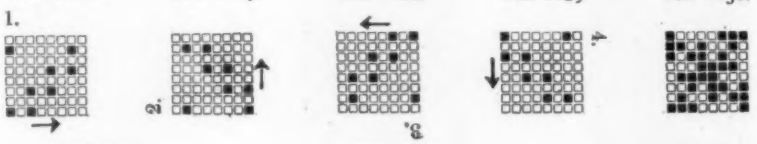


FIG. 1137. FIG. 1139 FIG. 1141.

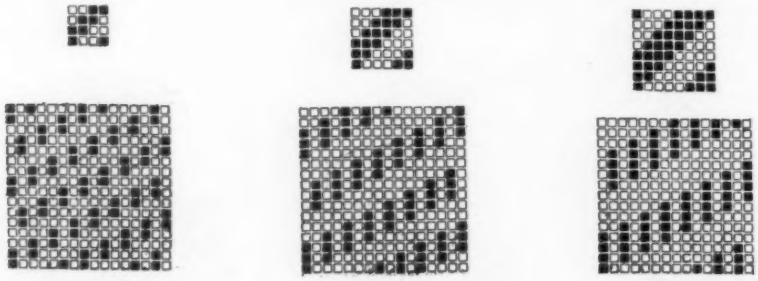


FIG. 1138. FIG. 1140 FIG 1142.

Other examples are shown at Figs. 1132.

1134 and 1136, which are derived from Figs. 1131, 1133 and 1135 respectively. A variation of this method consists in reversing the ground weave for two of the transfers, making the sinkers risers.

We have now completed the chapters on crepe weaves. It indicates methods for the production of an unlimited number of effects and is illustrated by several hundred weave patterns. Designing these effects requires not only imagination for the conception of new ideas, but also skill in drafting and the ability to decide what effect the weave will have in the goods.

THE BASIS OF MOISTURE STANDARDS FOR TEXTILE MATERIALS

From The Handbook of the Manchester (Eng.) Testing House

The moisture standards for textiles materials are based upon what is known as a system of "regain" whereby it is supposed that, taking the case of cotton, if 100 parts of absolutely dry material be exposed to the ordinary conditions of the air, 8 1/2 parts of moisture will be absorbed. Cotton is taken to include yarn.

It is a mistake to suppose that cotton in correct condition will contain 8 1/2 per cent. of moisture, and owing to frequent misunderstanding, it is necessary to make this clear. It will be seen above that 100 parts of absolutely dry cotton will become 108 1/2 by exposure to the air; since this 108 1/2 contains 8 1/2 of moisture, 100 will contain 7.834 per cent. (108 1/2 : 8 1/2 : 100 : 7.834). Therefore cotton in correct condition, according to the 8 1/2 per cent. "regain" standard, will contain 7.834 per cent. of moisture.

It should also be noted at this point that the actual amount of moisture absorbed by exposure to the air will depend upon (1) the length of time exposed, (2) the bulk of the sample, (3) the temperature of the air, (4) the barometric pressure, and (5) the amount of moisture present in the air. The standard of 8 1/2 per cent. is based upon an "average" condition of the air, but it would evidently be an impracticable method of testing to expect uniform results from exposure of samples to an assumed "average condition".

Attempts have been made to ascertain the actual basis whereupon the standard of 8 1/2 per cent. regain was originally fixed, but without result. There are, however, two entirely independent records of comparatively recent research which give a definite value to the figure and at the same time show the relation existing between the percentage of moisture contained in cotton or yarn and the humidity of the atmosphere to which such cotton is exposed. The first series of experiments were carried out by Schloesing in 1893, abstracts from his papers appearing in the "Journal of the Society of Chemical Industry," 1893 and 1894. In 1905 W. D. Hartshorne read a paper before the New England Cotton Manufacturers' Association, dealing with the same subject. Schloesing's research was unknown to Hartshorne until just before publication of the latter's paper, but in a concluding note the results obtained by both were compared, and a diagram shows the principal figures plotted in curved form for the two series in the same diagram. Though slight differences exist, the agreement is very close throughout the range of humidity relating to the fixture of moisture standards.

Schloesing's work may be properly looked upon as constituting the classical research upon which the "regain" for the various fibers finds scientific foundation, and with the object of giving publicity to this work, the editor of the "Textile World Record" (S. S. Dale) undertook the translation of the original French papers, and published them in his issue of November, 1908. Mr. Dale's translation was subsequently reprinted as a Manchester Testing House pamphlet, copies of which may be obtained free of charge upon application at the Testing House.

Schloesing states that the quantity of water contained in a hygroscopic material in equilibrium with the surrounding air is a function of two variables—namely, the relative humidity of the air and the temperature. This is doubtless well known to the greater number of physicists and chemists, but is less generally known than is commonly supposed. Requests are frequently made to have the humidity of this or that substance determined without giving the value of the

two variables upon which the humidity actually depends. We find in recent books such statements as the following: "Silk in a dry room contains . . . per cent. of moisture" and the exact figure is given without any reference to the hygroscopic condition or the temperature of the atmosphere. In a room called "dry," the hygroscopic condition, as well as the temperature, may vary within widely separated limits, causing the degree of humidity to vary to a considerable extent. There are also writers who speak of the natural humidity acquired by wool or cotton exposed to the air, and state the exact degree, as if such a degree could be fixed regardless of other factors. Such statements as these illustrate the need of directing attention to the conditions on which the humidity of textile material depends, and to the determination of those conditions.

When an equilibrium of humidity is fixed between a hygroscopic material and the surrounding air, there is at each temperature a relation between the humidity of the material and the relative degree of humidity in the air, so that a given value for the latter corresponds with a certain value for the former.

In a report on "Moisture in Raw Cotton and Yarn" presented to the 1912 Spring meeting of the Textile Institute by the Standardization of Tests Committee, attention was clearly drawn to the fact that neither Schloesing nor Hartshorne attempted to set up standards of moisture for the several kinds of textile fibers, but these investigators have shown the precise relationship existing between moisture in the fiber and moisture in the surrounding air. The report in question gives two examples to illustrate this point. It is shown by Schloesing's results that:

(1) If cotton contains 12 parts of water per 100 parts of absolutely dry weight, it can only retain its weight by exposure to air when the humidity is 85 per cent. saturated. (Humidity is expressed in terms of possible saturation.)

(2) If cotton is exposed to the air under conditions of 35 per cent. humidity, it will contain eventually 5 parts of moisture per 100 parts of absolutely dry weight.

Standards of 5 per cent. or 12 per cent. of moisture in cotton would be unreasonable, since stocks of cotton containing such percentages would either gain or lose in weight by mere storage in air of ordinary humidity. If it can be stated what degree of humidity commonly obtains in places where cotton is stored, the tables of Schloesing or Hartshorne will indicate the normal amount of moisture in the cotton when under such conditions.

COMBER TROUBLES

BY PAWTUXET

One Saturday morning a comber tender complained to me that a comber was giving her a lot of trouble. I told her to get the section hand, but she said he had worked at it and could not fix it. I sent for the section hand and asked him what he had done to it. He said he thought the dog was skipping and had reset the dog to the clutch wheel, but it did no good. So I started the comber up and watched it for a while. I could see that the ends would slack up in the pans and would then block the trumpet and break back, then the comber would stop; making it disagreeable for the comber tender and causing a loss in the production.

I tightened the two gears that drive the detaching rolls and then started the comber up again, but found it had done no good. I let the comber run for a while. I could see that the work was quite heavy so I took the percentage of the comber and found it was throwing only 12 per cent. back waste where it should have thrown about 19 per cent. I then looked at all the cams to see if there were any loose, but found them all right. I timed the comber. It was nipping at eleven and the detaching roll moved forward at six. I then looked to see what it was feeding at, and that was where I found the trouble. It was feeding at three where it should have fed at four. I found that the bolt which holds the pin plate to the index gear was loose and the jar of the machine moved the feed pin out of its place. I set the pin so it would feed at four, then tightened the bolt up, started the comber up, and we had no more trouble with that machine.

Knitting Department

THE KNIT GOODS SITUATION

At the present time the primary underwear market does not show any great amount of activity in so far as the selling end is concerned. There is, however, considerable interest in the matter of the goods already sold and manufacturers and agents are being urged every day by jobbers to hasten shipment and if possible to anticipate delivery dates that have been given on duplicate orders.

Many mills are now in a position so they cannot accept any further orders on light weights for the entire season and must soon turn their machinery over to heavy weight fabrics, if their fall deliveries are to be made on time. Notwithstanding the fact that deliveries generally are very much behind and that jobbers are clamoring for shipment of orders now booked, it is noticed there are very few orders being tendered for later delivery. There are some few makers who are in a position to take some orders for delivery during June and the probabilities are that with the advent of a few weeks of warm weather they will receive business enough to take care of any vacant spots that they may have from the quarters where the demand for immediate deliveries is heard the loudest.

We learn that in a measure the late call for heavy weights is responsible for the shortage in light weight production and many manufacturers were obliged to run on heavy weights four to six weeks later than usual. This had the effect of cutting into the next season's delivery by the same amount. Taking it as a whole, it may be said that the underwear business is in a very satisfactory condition from the manufacturer's standpoint. No stock lots have been accumulated and prices that have been obtained have been quite satisfactory.

The Amazon Knitting Co. have advanced their prices on ladies' straight ribbed vests from 5 to 7 1/2 cents per dozen and some lines of shaped vests and pants that were sold early as low as $1.75 are now being delivered at $1.85, while men's balbriggans to retail at 25 cents have been advanced quite generally from 5 to 12 1/2 cents per dozen.

A number of jobbers have reported that deliveries of men's combination suits are particularly slow and these manufacturers are being supplied with duplicate orders just fast enough now to prevent their catching up on the deliveries.

The flood in the Piqua section had the effect of cutting into the production very seriously during the past month both by reason of there being a shortage of yarn and supplies, as well as causing a demoralized condition of the help, it being necessary in many cases for them to be away from the mills to look after their own property and families, and after operations were resumed in the mills, it was some time before freight shipments were accepted by the railroads, and many cases were, therefore, ordered by express.

From several retail departments it is learned that there is a tendency on the part of many women to discontinue the use of knit pants made with elastic silesia or sateen bands, and that instead, the call for pants made with tapes in the top is increasing very rapidly. This practically constitutes an equestrian tight and is generally worn under the corset. Pants and combination suits with lace trimming at the knees are not being taken as freely as before, but the call has been for those made with tight fitting knees and in addition to this, a considerable call has developed for very short length combination suits called trunk lengths. These are finished with plain over edging or with shell trimming.

The call for bloomers or knickerbockers is increasing and these popular garments are now being shown in fine cotton or lisle to sell at $1.00 and upward and in Venetian or Italian silk at $3.00 and up. These are made with elastic rubber bands at the waist and knees.

Ladies' combination suits made on Swiss ribbed machines are being taken very freely in all grades and in some localities a splendid demand is felt for those made with concealed tape in the neck and arm sizes, and a number of manufacturers are looking forward to this as a very desirable style of trim for many of next season's lines.

HOSIERY

Notwithstanding the tariff talk and the strong indications that a 50 cent duty will be in effect within a few months, the hosiery business of this country is in a very strong position, and it is difficult to see how any material change will take place until well into the month of July or possibly later. The fact of the matter is, hosiery mills are heavily oversold and some of them cannot produce the goods for which they now have orders before October first and practically none of them are in a position to take any new orders for delivery this side of August first. The demand from consumers and retailers the country over is being felt so strongly that price consideration does not enter into the matter, as it is simply one of getting the merchandise to deliver.

There have been very few hosiery buyers in the market recently and in fact we do not know of any good it would do for them to be there, as there is so little merchandise being offered for sale. Many letters are being written, urging that shipments be made, but we are told there is scarcely a jobber in the country who has anything like a complete line from which to fill orders at the present time. There are no cancellations being received as yet, although these may be looked for soon, as it is quite sure that the change of tariff talk will have the effect of causing buyers to endeavor to get out from under some of their purchases. The 50 per cent. duty, if passed, would have the effect of reducing prices of seamless goods all along the line. Importers would be able to land fashioned goods in the neighborhood of $1.55 in the same grades that landed under the Dingley Bill at $1.70 and under the Payne Bill at $1.90, and it is believed that the trade in general will take fashioned stockings in preference to seamless at the same price, though lines of fine seamless goods at $1.37 1/2 to $1.90 will be forced down to lower levels.

Wood silk hosiery to retail at 25 cents continues in good demand, as well as silks to retail at 50 cents to $1.00. In the better grades almost every conceivable shade is being shown in the effort of retailers to catch the trade of the consumers, who feel they must have hosiery to match every different shade of gown.

Probably one of the scarcest lines of hosiery is children's goods to cost from 65 to 85 cents. This range of merchandise may not present as attractive margins to manufacturers as others and for this reason fewer manufacturers are making the goods, and those who are have more orders than they can fill.

Men's 176 needle half hose is also somewhat scarce and deliveries are from five to seven weeks behind dates given when the orders were placed last fall.

Manufacturers are quite pleased with the business that has been placed on fall weight cottons, as well as fleeced and wool goods. Buyers generally bought these quite freely and while no duplicates have as yet been offered, it is not usual for these to be in evidence much before July first.

SWEATERS

It is estimated that the sweater business so far placed is at least 33 1/3 per cent. larger than at any former year and many sweater mills are sold up for the season. This business is not alone that placed by jobbers with manufacturers, but many jobbers have taken orders from retailers proportionately larger and those makers who sell the retail trade direct also report phenomenal business. Advance prices have been obtained on many duplicate orders since the opening quotations were made. The orders so far placed have been mostly for shaker knit and rope stitch goods for both men's and women's departments. Shawl collars principally have been taken, although a large percentage of Byron collars have been sold, but with very few low

necks. In the East, maroon has largely outsold other colors, but in the middle and far West, oxford grey seems to be the principal color called for. Navy blue has increased in popularity to some extent and Havana brown has been taken quite freely in some localities.

Cotton coats to retail at 50 cents each have sold largely and the manufacturers have advanced their prices several times, so that at the present time they are practically beyond the limit for 50 cent retailers, one manufacturer getting as high as $4.37 1/2 for those made with Byron collar and pockets, although large orders were taken early at $3.75 to $3.87 1/2.

Boy's cotton coats that opened in January at $3.25 are now being sold at $3.62 1/2.

The Union Mills have recently brought out a new men's coat made on a shaker machine at $7.50. It is understood that some of the large Western buyers have taken this garment freely.

The bulk of the sweater business, however, has been done on better goods and some very attractive shaker knits have been sold at $15 to $20 and rope or Jumbo stitches at $18 to $24. The next popular price at which large quantities have been sold are some lines of 30 pound shakers sold at $33 per dozen, either with shawl or long double Byron collars.

Boy's worsted coats with rough neck at $7.75 and wool mixed coats at $7.50 have been sold very largely, as also a wool mixed cardigan stitch with Byron collar at $13.50 and shawl collar at $15.

Owing to the large quantity of material bearing on knitting processes which is contained in the report of the meeting of the National Association of Hosiery and Underwear Manufacturers, the knitting department in this issue has been reduced to three pages.

The present annual output of the Barcelona and Reus, Spain, silk factories is valued at about $7,200,000. The number of looms engaged in the weaving of silk in this district is 1,200.

COST ACCOUNTS IN A KNITTING MILL

Editor Textile World Record:

I would like to have an explanation of a system for keeping cost accounts in a knitting mill making ladies' union suits. I do not expect to get the exact cost of the goods as that varies from mill to mill and from month to month, but what I want is a method of keeping track of the cost.

Manufacturer (2151).

The cost varies so much from day to day that the only practicable way is an annual or semi-annual inventory. Some years ago the owner of a mill in the Mohawk Valley with some cost keeping experts, spent a month and a barrel of money trying to install a weekly cost account system, but it was a failure. This one mill has grown into several large and small plants, and the semi-annual inventory takes the place of the costly system. If union suits alone are made, a fair average could be had by keeping account of the number of dozen finished daily, style, size and price being considered. One of the replies I received from a mill owner was to the effect that he was using electricity for power and as a result the cost of coal varies from $2 to $4 more per day in winter than in summer. Trenton.

RIDGY EFFECT IN KNIT GOODS

Editor Textile World Record:

On a 16-gauge spring needle machine having four feeders, using 23 1/2-grain yarn (basis 20 yards) what variation in the yarn would there have to be to make the cloth look ridgy? Would two grains either way do it? Robson (2152).

The variation of yarn in weight, two grains either lighter or heavier, if the yarn was evenly spun from good carding, would not make the knitted cloth look ridgy or uneven; it would only make the cloth heavier or lighter in the weight of the finished garment. Not only would a much greater variation than that be necessary to make the cloth ridgy, but the yarn on each one of the four feeds would have to vary in size.

Ridgy or uneven knitting is generally caused by uneven or badly spun yarn, which is sometimes due to the stock used. Variations in the weight of well carded and evenly spun yarn will not cause ridgy knit cloth.

F. W. Herington.

Questions and Answers

Under this head we undertake to answer, free of charge, to the best of our ability, questions pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

If the question is not of general interest to textile readers and involves expensive investigation, a charge covering the cost may be made, of which the inquirer will be advised before any expense is incurred.

BLEACHING WITH SODIUM HYPOCHLORITE

Editor Textile World Record:

Please let me know if sodium hypochlorite can be successfully used in the following manner:

100 lbs. bleaching powder.
50 gals. water.
60 lbs. soda ash.
25 gals. water.

The bleaching powder is mixed in a cement tank at 11° to 12° Tw. and allowed to settle. Draw enough of the solution for one day's work, put in a small tank and add the boiled soda ash solution in above proportion. Allow to settle and use at required strength. I am using chloride of lime solution at 1° Tw. Could sodium hypochloride solution be used at the same strength? My reason for preferring this method is that you mentioned some time ago in the Textile World Record that sodium hypochloride if allowed to stand for any length of time would evaporate and turn yellow owing to the iron in the soda ash.

Clayton (2130).

The bleaching powder and the soda ash solutions can conveniently be mixed when each is ready, thus producing a strong hypochloride liquor. If 12 1/2 gallons of water more than is indicated in the recipe is added to the soda ash solution, a final hypochloride of soda standing at or near 7° Tw. will be obtained, and with a total volume of about 190 gallons. This solution will serve for most bleaching purposes, but as a general rule it must be considerably reduced in strength with water. Usually a Twaddle strength of 1 1/2° to 2 1/2° is quite sufficient. Regarding the value of the readings of a Twaddle is of, but little reliance can be placed upon them, as the degree shown on the glass is not an index of the content of bleaching chlorine. The only proper means of determining the strength or bleaching value of a solution is to make a direct determination by means of standard solutions of hyposulphite of soda and of iodine, which may be prepared for mill use, where no chemist is employed, by any local druggist. Certain inexpensive chemical apparatus is necessary to carry out the process, which can be found described in any text book on volumetric analysis. Where bleaching is constantly done, the chemical control of the bleach baths and stock liquors will effect a very distinct saving in bleaching, and also tend to prevent the conditions due to over-bleaching.

Regarding the turning yellow of the stock bleach solution, this is not directly due to the presence of iron, but to chlorine compounds. Of course, where such liquors are stored in cement cisterns or vats, iron will always be present. As to evaporation, the vats should be kept well covered. If only small quantities of liquor are required at a time, then smaller quantities of stock bleach need be made up. L. J. Matos.

The formula given by "Clayton" for the preparation of sodium hypochlorite liquor from solutions of bleaching powder and soda ash is a fairly good one, although in order to obtain a solution from which all of the lime has been eliminated it would be better to use 65 pounds of soda ash in place of 60 pounds as suggested. Furthermore, in order to utilize entirely the bleaching efficiency or active chlorine contained in the bleaching powder, instead of mixing up the bleaching powder and soda ash in separate solutions and then mixing the clear liquors together, it would be better first to prepare the bleaching powder solution by stirring up the hundred pounds of bleaching powder with 50 gallons of water until all the particles are completely broken up, and then adding directly to this the solution of 65 pounds of soda ash in 25 gallons of water, continuing the stirring for 15 or 20 minutes and then allowing the precipitate of carbonate of lime to settle.

In this manner a very good solution of sodium hypochlorite may be prepared, utilizing to the fullest extent the active chlorine contained in the bleaching powder and at the same time removing from the liquor all of the lime. The liquor will settle quite rapidly. After settling for two hours the clear liquor can be drawn off into another tank from which it can be used and diluted as desired. The tank containing the sediment can then be filled up again with water, stirred for a few minutes and then allowed to settle again for one hour. The clear liquor is then drawn off and can be used in connection with the strong liquor of the first settling. By this means practically all of the active chlorine can be obtained from the bleaching powder and the exhausted sediment can then be run to waste. The sodium hypochlorite solution if held for any length of time should be kept in a covered vat so as to prevent, so far as possible, evaporation, and also the action of the carbonic acid of the air. If this is done the solution can be kept for quite a long period of time with very little loss of effective bleaching power. The soda ash employed for this purpose should naturally be free from iron, as this might contaminate the sodium hypochlorite solution and cause it to become yellow. Also the vats in which the solutions are prepared, settled and stored should be of cement. There is no trouble, however, in obtaining soda ash in a commercial way practically free from iron. The proportions given for the ingredients presuppose that the bleaching powder employed has about 36 per cent. available chlorine and that the soda ash is of a 8° alkali.

The use of sodium hypochlorite solutions for cotton bleaching is coming more and more into practice among not only bleachers of fine cotton goods and colored fabrics, but also even among the large bleachers of ordinary white goods. A really better process for preparing the solution of hypochlorite, however, is to use directly liquid chlorine in a solution of caustic soda or soda ash. By this means the disagreeable features entailed in the handling of bleaching powder are eliminated, and furthermore there is no bulky and disagreeable sediment to get rid of. The process using liquid chlorine is very clean and neat and can be handled with the greatest degree of efficiency as far as the utilization of the chlorine is concerned in the preparation of the solution, and also with respect to the use of this solution in the bleaching operations. The majority of the large and progressive bleacheries in New England as well as other parts of the country have already adopted the use of liquid chlorine in their mills. J. M. Matthews.

THE MARKET FOR BRITISH TOPS AND YARN

Editor Textile World Record:

Can you give me a definite idea of the English market for worsted tops and yarn? I would like to know about the different grades of both tops and yarn, the prices at which they are selling, and the trade names given to them.

Claremont (2135).

Our English representative sends us samples of the principal grades of worsted tops and yarn sold on the Bradford market with this statement in regard to them:

I am at last able to send you a selection of yarns by the best Bradford spinners. The samples are given distinguishing numbers and the accompanying list explains nearly all that it is necessary to say. The quality numbers of tops are quite nominal and comparison of the last two columns of figures shows how far the spinner goes. In merinos there is quoted a 60s top which isn't spun past 2/36s, a 64s top that goes to 2/62s, and a better 64s top that is spun to 66s. What this spinner thinks fit to call 64s is better than the best topmaker's quality going by the same name. Nos. 40, 500 and 800 can be called what you like. They are very fine qualities made by a spinner who buys the best of Australian greasy fleeces and sorts them according to his own rigid standards. He always gets the highest prices and is always as busy as any competitor and his yarn is invariably right.

The list enclosed gives the topmaker's quality numbers and in the next column is given the usual meaning of these numbers (7c = 40s carded). The quality numbers were attached by a spinner attached at my request. The topmaker's 40c implies 40s

carded, but the spinner doesn't call this 40s. In his eyes it is a 36s. Similarly he regards 8s (46s) as not better than 44s and 9s (50s) as 48s. Another spinner accustomed to a different standard might agree with the top-maker as to the numbering, but I give what I got. Whoever bought the goods would buy on the sample, not on the name.

In botanies yarn (merinos), the price of 2/24s is the basis. In 000, 2/24s = 2/11 1/2 and 2/60s = 3/5 1/2. In other words 6d is added here for spinning thirty-six counts finer, equalling 1d for six counts. In No. 12 the extra for 2/66s is 1d over 2/60s again. In 800 the extra for 2/80s is 3 1/2d on 2/66s.

TOP SAMPLES

Topmaker's Label		Spinner's Name	1909	Approximate present prices
40c		36s	11¼	15d
7d=40s	carded	40s	12	15½d
8 =46	"	44s	13	17
9 =50	"	48s	16¼	20
10 =56	"	56s	18½	22½
11	"	58s	20½	24½
13	"	60s	23	27
14	"	70s	25	29

YARN SAMPLES

No. 1, English wool. Count of sample, 2/12s; price, 34 cents; finest count spun, 2/20s; quality of tops, 32/36s carded; use, hosiery and costume serges.

No. 2, Crossbred and English wool. Count of sample, 2/32s; price, 43 cents; finest count spun, 2/32s; quality of tops, 36s prepared; use, dress goods and braids.

No. 3, crossbred and English wool. Count of sample, 2/36s; price, 47 cents; finest count spun, 2/36s; quality of tops, 40s prepared; use, dress goods and braids.

No. 4, Crossbred and English wool. Count of sample, 2/40s; price, 51 cents; finest count spun, 2/40s; quality of tops, 40/44s prepared; use, dress goods and braids.

No. 5, Colonial crossbred. Count of sample, 2/20s; price, 39 to 40 cents; finest count spun, 2/24s; quality of tops, 44s carded.

No. 6, Colonial crossbred. Count of sample, 2/20s; price, 41 cents; finest count spun, 2/32s; quality of tops, 46s carded.

No. 7, Colonial crossbred. Count of sample, 2/20s; price, 46 to 47 cents; finest count spun, 2/32s; quality of tops, 48s carded.

No. 8, Colonial crossbred. Count of sample, 2/20s; price, 47 cents; finest count spun, 2/36s to 2/40s; quality of tops, 48s carded.

No. 9, Colonial crossbred. Count of sample, 2/20s; price, 56 to 58 cents; finest count spun, 2/40s; quality of tops, 50s carded.

Samples Nos. 5 to 9 are used for hosiery and serges, for boys' suits and blue costumes for women, and samples No. 5 to 7 are also used for cheap stockings.

No. 00, Australian. Count of sample, 2/20s; price of 2/24s, 69 cents; finest count spun, 2/36s M; quality of tops, 60s Botany.

No. 000, Australian. Count of sample, 2/20s; price of 2/24s, 71 cents; 2/60s, 83 cents; finest count spun, 2/62s M; quality of tops, 64s Botany.

No. 12, Australian. Count of sample, 2/60s; price of 2/24s, 73 cents; 2/60s, 87 to 89 cents; finest count spun, 2/66s; quality of tops, 64s Botany

No. 300, Australian. Count of sample, 2/60s; price of 2/24s, 75 cents; finest count spun, 2/70s M; quality of tops, 70s Botany.

No. 40, Australian. Count of sample, 2/60s; price of 2/24s, 77 cents; finest count spun, 2/74s.

Nos. 00 to 500 are used for stockings, knit goods, suitings, gaberdines, dress goods, spun in different counts and twists for the different purposes.

No. 500, Australian. Count of sample, 2/80s; price of 2/24s, 89 cents; price count 2/80s, $1.10; finest count spun, 2/80s M; use, dress suitings.

Note: 2/24s is basis price for Botanies and other prices advance from it in regular progression "M" signifies good milling qualities.

Wessex.

The twenty-four samples of tops and yarn can be seen at our Boston office.

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WOOL SCOURING TESTS AT THE BRADFORD CONDITIONING HOUSE

Editor Textile World Record:

I have been informed that the Bradford Conditioning House tests large quantities of grease wool for shrinkage and conditioning. My informant states that measured by value the amount is very large and that the conditioning house has found it necessary to build additional storehouses in order to handle the grease wool and other materials that are delivered to the establishment daily for testing. Can you give me definite information in regard to these matters?

Botany (2159).

This inquiry was referred to our English correspondent, who replies as follows:

If you went into a large and busy mill and found that the single weaving equipment was four hand looms you would deem it superfluous to ask whether the concern turned out a great lot of cloth. So if you went to the conditioning house and saw scores of ovens upstairs served almost like spinning machinery you could see there was a big business done in moisture tests. Then if you were taken down to the corner in the basement where the apparatus for dealing with grease wool is placed the contrast would resolve all your doubts. You would need nobody's word to assure you that the work of the grease wool department is absolutely insignificant. No assurance that "measured

by the value of the material" the department makes a respectable amount, affects the fact that very little wool is presented for scouring at the Bradford Conditioning House and that the apparatus for treating it is very slender, that the grease wool tests are few, that the process of testing is slow and that the department does not pay, although the charge is twice that for testing for moisture from bulk lots and 3 1/2 times as much as for moisture from sample lots, as a minimum.

Grease wool is rarely conditioned. As you know, the colonial wools are not sold under any guarantee of conditions at first hand and the English wools certainly are not. The Buenos Aires wools are largely bought on a basis of "guaranteed yield," but it is not the grease wool that is then conditioned, but the resultant tops and noils. A man merely wanting to satisfy himself as to the net yield of a parcel of wool needs no independent certifying authority. He scours his own sample or, which is the same thing, sends it to a scourer or comber. A conditioning house certificate is needed only when one has to convince somebody else of the facts respecting a given lot and I have very little doubt that the main part of the wool tested by scouring in the Bradford Conditioning House is wool destined for America. The wool I saw in process of scouring was Chinese for America. It was or had been limey and about such a lot there might well be a greater degree of uncertainty than about more civilized material. It is a highly unusual occurrence to sell grease wool otherwise than by judgment.

You ask for statistics. Here are particulars of weight of goods passed through for testing purposes in 1911:

Tops, 72,150,949 lbs.; wool, 9,192,924 lbs.; noils, 5,064,618 lbs.; waste, 5,806,607 lbs.; worsted yarn, 2,769,729 lbs.; cotton yarn, 120,396 lbs.; silk yarns, 20,316 lbs.; to weigh only (not to test), 945,199 lbs., a total of 96,070,738 lbs. These figures show that three-fourths of the goods are tops.

Now as to the number and nature of the tests (1911):

Moisture	Yarn Counts	Scours	Various	Total
222,998	4,746	3,464	6,759	237,967

This statement shows that 11 tests out of 12 are for moisture and 1 test in 64 is a scouring test. It is perfectly immaterial which year one takes.

In 1910 out of 235,417 tests, 218,454 were for moisture.

In 1909 out of 213,582 tests, 197,996 were for moisture.

The scour tests include tops and yarns and it is morally certain that the great preponderance of tests are made on tops to make sure that the topmakers are not exceeding the permissible limits of oiliness. These and yarn scours are done in a different room from those on grease wool.

It is true that extra warehouses have been rented for the conditioning house purposes at Bradford and the ultimate construction of a much larger establishment than the present large one is in view. The enlargement is not necessitated by any rush of grease wool, but by the need for dealing in quick time with the moisture tests. Time is an important element in the transactions and the yard and streets leading to the House are blocked with the traffic which cannot be got in and out quickly enough for want of room, doors and cranes.

The goods go in bulk and this feature distinguishes a conditioning house, as at Bradford, from a testing house, as at Manchester, the latter consisting simply of offices and laboratories. The Bradford place is a great warehouse or transit shed to which tops are delivered from the combing sheds. It was put up to meet the needs of the export trade and to give foreign customers a certificate that, whatever the weight and condition on arrival, the facts were so-so at the time of delivery and to give a correct condition weight on which to pay. The House was used principally for export purposes, but now the quantity of tops conditioned far exceeds the quantity exported. You will see from the statistics that some goods are received for weighing only and doubtless most of this is raw wool.

It would, of course, be a much bigger task to deal with raw wool than with the resultant tops. The combing ensures that tops are fairly homogeneous, but with the raw

produce everything is different and worse to manage. A man with 20 years' experience in conditioning tests informs me that the only way to deal with bulks of wool to determine the scoured weight would be to draw a number of bales as samples of a large lot, wash them by machine, dry them and accept that result. This might spoil the wool for the purpose for which it was intended, but one can't make omelettes without breaking eggs. Commercial people don't feel they have got to rock bottom until bale tests have been made of wool in the grease and government officials would have no better cause. Say there are 50 bales of only 300 pounds each or 15,000 pounds in 50 separate wrappers. What does a 50-pound sample or even 100-pound sample amount to? Where wool is bought under a standard contract, guaranteed yield, from South America this clause is contained in the order:

Not less than 15 bales or 10 per cent. of the 100 bales or over to be tested.

The trade doesn't take chances on a sample weighing one-third of one per cent. of the shipment. Why not?

I hope I have shown you clearly that the Bradford Conditioning House doesn't, can't and isn't likely to deal with much grease wool for scouring. It hasn't the plant for the job and people don't trust small tests or accept them as sufficient for their own satisfaction. The facts, figures and inferences are all one way and I shall begin to believe that everything is as "Botany" believes when the people in the business change their practices in the matter. Regent.

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BREAKING STRENGTH OF YARN

Editor Textile World Record:

How can the breaking strength of yarn be increased? Wanamet (2141).

The strength of yarn can be increased up to a certain point by adding twist. After that point is passed the addition of twist tends to lessen the strength of the yarn. Of course, the strength of yarn can also be increased by the use of better material or by doubling and twisting two or more strands together.

SIZE OF YARN FOR GAUGES

Editor Textile World Record:

What sizes of yarn are best suited for 4, 5, 6, 7 and 8 gauge work on the Edward Dubied flat knitting machine? Please state the correct size for each gauge. Calgary (2157).

We referred this question to E. O. Spindler, 350 Broadway, New York, an importer of knitting machines, who replies as follows:

The correct sizes for the different gauges are as follows:

For machines with 4 needles per inch 4-ply 12s worsted.

For machines with 5 needles per inch 4-ply 16s worsted.

For machines with 6 needles per inch 3-ply 19s worsted.

For machines with 7 and 8 needles per inch to 3-ply 21s worsted.

These are the counts as they should be used for the respective gauges. Manufacturers disagree, however, quite frequently and I know cases, for example, where people knit 2-ply 18 on five cut machines.

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REMOVING LINSEED OIL FROM CAMEL'S HAIR

Editor Textile World Record:

I would like some information on how to remove all traces of linseed oil from camels' hair. I believe there is a formula for this. Mannox (2133).

In removing linseed oil spots from textile materials two things should be considered: First, whether the spot is fresh. If it is, the stain can easily be removed by the aid of a piece of white wool flannel soaked in turpentine. It is occasionally necessaary to repeat the operation two or three times. Second, whether the spot is old or has been subjected to the action of steaming or calendering. In that case, the stain is removed with hot water and an alkaline soap applied with a piece of white wool flannel. Let the sample dry and then treat the stained part with a mixture of alcohol and ether in equal parts. If traces of the oil still remain it can be generally removed by rubbing with a cloth soaked in a solution of sulphate of carbon. Gaul.

Dyeing, Bleaching, Finishing, Etc.

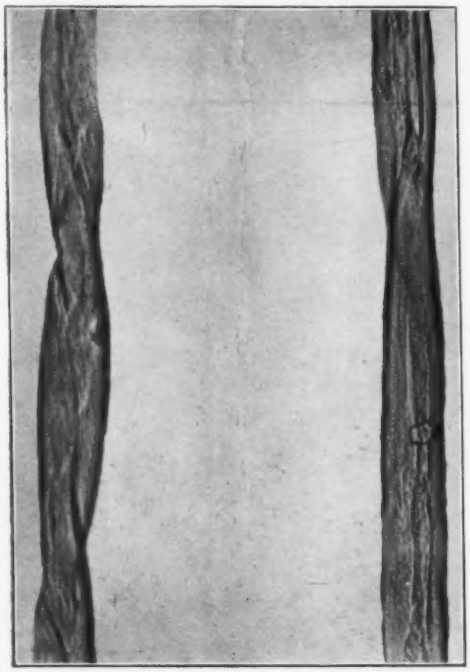
THE HYGROSCOPIC QUALITIES OF BLEACHED AND UNBLEACHED COTTON

By Leo Pinagel, Director of the Public Testing Bureau for the Textile Industry, Aachen, Germany.

Translated from the German by the Editor of the Textile World Record.

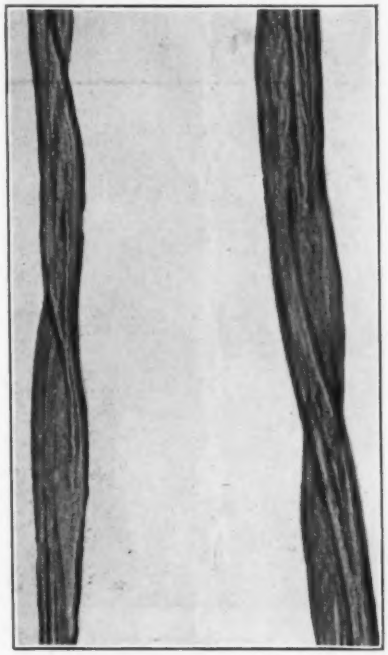
All textile materials have the property of absorbing moisture, this power varying with the structure of the fiber. In 1875 the International Congress at Turin adopted the following standards for regain, each being based on the dry weight of the material.

Silk	11%
Worsted tops and yarn	18¼
Washed wool and washed yarn	17
Raw cotton and cotton yarn	8½
Flax	12
Hemp	12
Tow	12½
Jute	13¾



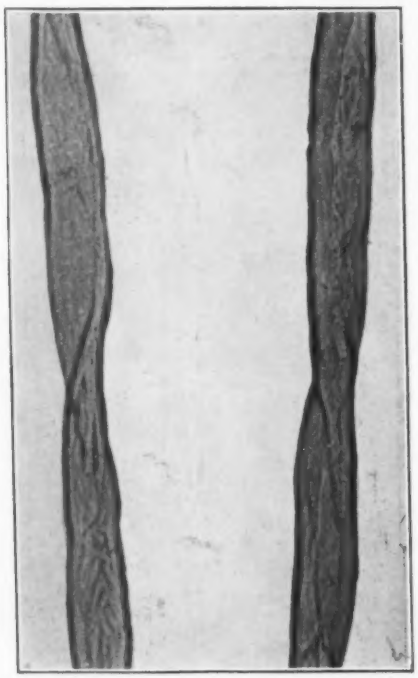
F 1. SUPERIOR TEXAS COTTON, UNBLEACHED AND BLEACHED.

Cotton has the least power of absorbing moisture, while wool has the greatest. This property of textiles is of great importance, not only in trade and commerce, but also for the consumer, who endeavors to clothe himself to suit the season; in winter, with fabrics to keep the body warm; in summer, with lighter and more porous cloths to facilitate the escape of the natural exhalations from the skin. It is also of importance for sanitary reasons to have the body clothed with material that will absorb perspiration caused not only by the temperature of the surrounding atmosphere, but also by muscular exertion. This is especially true of underwear, which comes in direct contact with his body. Many of the different fibers are naturally of a yellowish shade and are frequently bleached in order to produce a



F 2. AMERICAN COTTON, UNBLEACHED AND BLEACHED.

clear white. The bleaching process causes a change in the structure of the material. The question arises whether and to what extent bleaching changes the absorbtivity of textile materials. Cotton contains, besides other materials, cotton wax, which is a fatty substance. Fatty materials do not absorb moisture. Fats shed the water and do not mix with water. According to Lowenthal cotton contains in addition to moisture, about 5 per cent. of natural impurities which



F 3. EAST INDIA COTTON, BLEACHED AND UNBLEACHED.

are insoluble in water, but soluble in alkali. These impurities consist of cotton wax, fatty acids, coloring matter, pectic acid and albuminous matter. The bleaching process removed these organic materials and it may, therefore, be assumed that the absorptivity of the fiber is increased. In order to establish this tests were made as follows: Yarn spun from these grades of cotton in bleached and unbleached condition were dried in the conditioning apparatus and the dry weight noted. These yarns were then hung in the same room and each skein was weighed at the end of 60 hours with the following result:

1—Superior Texas Cotton

Unbleached	25,400 — 28,200 =	9.93%
Bleached	24,500 — 27,000 =	9.25

2—American Cotton

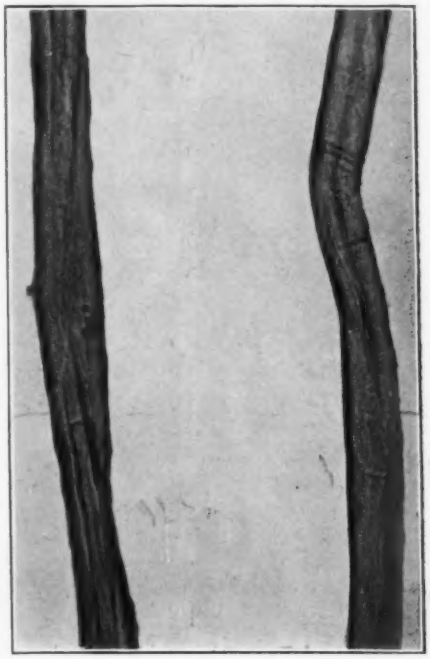
Unbleached	27,950 — 30,900 =	9.54
Bleached	21,550 — 24,300 =	10.20

3—East India

Unbleached	21,100 — 23,800 =	11.34
Bleached	16,650 — 18,700 =	10.96

4—Sea Island Cotton

Unbleached	14,950 — 16,500 =	9.40
Bleached	14,050 — 15,500 =	9.35



F 4. COCONADA COTTON, UNBLEACHED AND BLEACHED.

5—Coconada Cotton

Unbleached	31,050 — 34,500 =	10.00
Bleached	26,850 — 29,700 =	9.60

6—Egyptian Delta Cotton

Unbleached	30,700 — 34,100 =	9.97
Bleached	29,500 — 32,700 =	9.79

7—Upper Egypt

Unbleached	27,950 — 30,900 =	9.54
Bleached	25,950 — 28,400 =	8.62

8—Joanovich cotton

Unbleached	27,300 — 30,400 =	10.19
Bleached	26,400 — 29,200 =	9.59

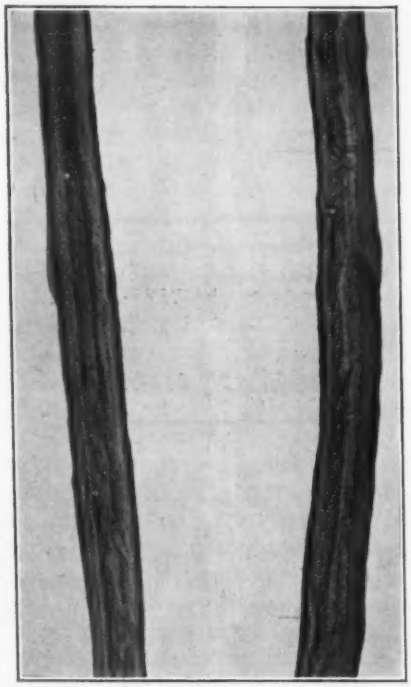
9—White Abassi Cotton

Unbleached	.....	17,900 — 19,900	= 10.05
Bleached	.....	16,800 — 18,700	= 10.16

10—Egyptian Delta Cotton

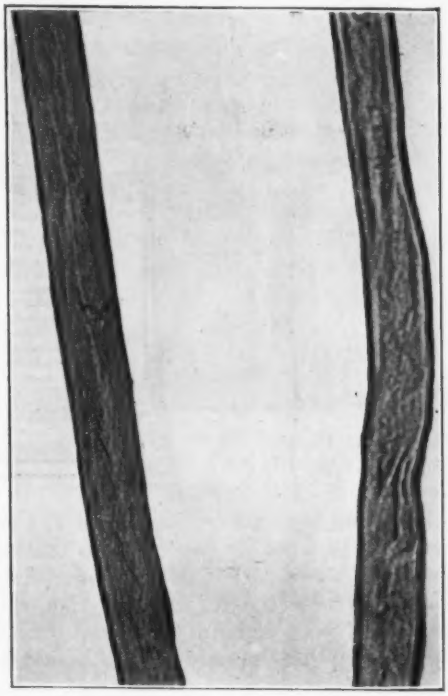
Unbleached	.....	23,300 — 26,000	= 10.39
Bleached	.....	22,200 — 24,500	= 9.38

With only two exceptions, Nos. 2 and 9, the absorptivity of the bleached yarn was less than that of the unbleached. This result is surprising since it conflicts with the natural assumption that a fiber from which the organic matters have been removed must have a greater power of absorbing moisture. It is interesting to learn the reason why the contrary result was reached. To make the matter clear I refer to the accompanying microphotographs: F 1, superior Texas cotton unbleached (a) and bleached (b); F 2, American cotton, unbleached (a) and bleached (b); F 3, East India cotton, unbleached (a), and bleached (b); F 4, Coconada cotton, unbleached (a), and bleached (b); F 5, white Abassi, unbleached (a), and bleached (b); F 6, Joanovich cotton, unbleached (a), and bleached (b).



F 5. WHITE ABASSI, UNBLEACHED AND BLEACHED.

The structure of the unbleached cotton is sharply defined while the bleached fiber appears as if it were coated with a gelatinous mass. The bleaching process covers the structure of the fiber and makes it less capable of absorbing moisture. The question than arises as to why the American and white Abassi cotton, Nos. 2 and 9, absorb more moisture when bleached than when unbleached. In the case of the American as well as the Abassi yarn, the bleached material does not have the appearance of being coated as have the other four samples. The difference is so marked that all doubt is removed. All the indications lead to the conclusion that if samples, 2 and 9, had been bleached to the same extent as the others, the absorptivity of the bleached yarn in these two cases would have been less than that of the unbleached yarn. Having reached these conclusions regarding the



F 6 JOANOVICH COTTON, UNBLEACHED AND BLEACHED.

water absorbing power of bleached and unbleached cotton, it remains for us to make a practical application of the facts. Cotton is used largely in the manufacture of underclothing and also for night-clothing for children. For such purposes cotton serves certain hygienic purposes and the question arises whether a night garment for children is warmer if made of bleached cotton than when unbleached. Since bleached cotton, as we have seen in most cases, absorbs less moisture than does unbleached cotton, the preference must be given to the latter.

As stated at the beginning of this article, the standard regain for cotton is 8 1/2 per cent. and for wool, 17 per cent., so that according to these standards the absorptivity of wool is twice that of cotton. If a yarn is made of 50 per cent. wool and 50 per cent. cotton the standard regain would be on an average 12 3/4 per cent. If, therefore, the question is one of absorbing moisture from the body, a mixture of cotton and wool is to be preferred to clear cotton. Underwear is usually knit so that the fabric is made of a succession of loops. This knit structure is especially well suited for underclothing, because the evaporation of the moisture from the body is facilitated. Knit underclothing protects the body against sudden cooling and therefore results in more sanitary conditions. Thick or well fulled fabrics, on the other hand, retain the moisture much longer and cause an uncomfortable feeling of chilliness which is to be avoided because of the danger of catching cold. The conclusion follows that the air necessary for the gradual evaporation of moisture will pass through the fabric more slowly when it is heavy and closely woven and fulled.

SKEIN YARN MERCERIZING MACHINE

The accompanying illustrations are sectional drawings of a skein yarn mercerizing machine invented in Germany and recently patented in this country. It is described by the inventor as follows: The machines

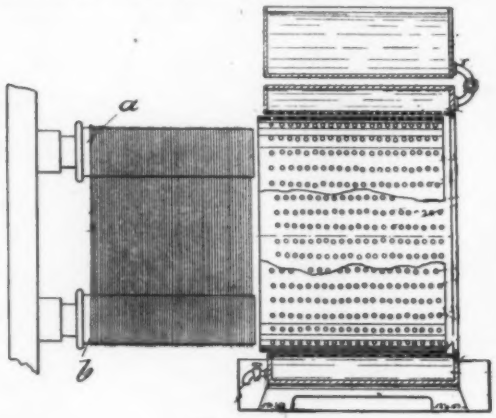


FIG. 1.

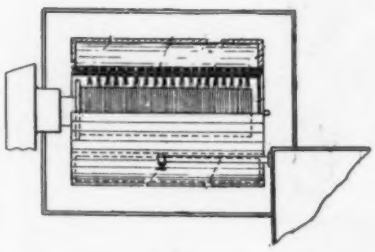


FIG. 2.

hitherto employed for mercerizing yarn in skeins are of two classes. With the kind usually employed the skeins are laid around the two stretching rollers and immersed in a horizontal position. The two rollers being arranged in the same horizontal plane, dip with the skein into the liquor so that only the lower portion of the skein will be covered approximately up to the level of the lowermost point of the rollers. With the machines of the second class the two rollers are arranged in a vertical plane and the skein laid around them dips together with the lower roller into the liquid beyond the uppermost point of the periphery of the latter.

Both these classes of machines have the same disadvantage, that the skein on the rollers considered with regard to the different portions of its length will come in contact with the liquor at such times, that a

considerable difference in the effect of the liquids upon the various portions of the length of the skein will result. The travel of the skein around the rollers must be comparatively slow for insuring a good impregnation with the liquid. It is obvious that the parts of the yarn which first dip into the liquor will begin to shrink under the influence of the lye, while the other parts, which have not yet dipped into the liquid, will be stretched in consequence of the shortening of the length of the skein caused by such shrinking. This stretching will be the greatest with the portion of the yarn coming last of all in contact with the lye.

The part of the yarn dipping first into the lye will absorb under otherwise equal conditions more lye and shrink more than the part dipping last, so that the gloss will be unequally distributed. Similar effects are also observed at the immersion of the yarn into the rinsing liquor, or on the yarn being sprinkled with the latter. Where the impregnation commences or where the drops of hot water fall first, the effect of the lye will be more conspicuous or will be interrupted more powerfully than elsewhere, so that differences in the appearances of the final product will result.

The improved apparatus consists of an improved machine for mercerizing yarn in skeins, in which the two rollers, over which a skein is laid, are disposed in the same vertical plane. The skein on the two rollers is brought into contact with the liquor at once and over its entire length, so that the time of impregnation or rinsing is the same, that is, the whole skein of yarn is completely and uniformly covered with the lye or rinsing liquid at one time.

Fig. 1 is a vertical longitudinal section through a part of the improved machine, the sprinkling device being moved aside; Fig. 2 is partly a horizontal section and partly a plan view of the machine, only so much being shown as is sufficient for the understanding of the invention. The device for sprinkling the yarn is shown in Fig. 1 moved away from the two rollers, a and b. A casing having two opposite openings in the side walls and being consequently open, is closed with a sieve covering its cavity. The sieve has a large number of small holes as shown. A perforated slide fits the inside of the sieve and has the same number of holes as the latter, so that for the position of the slide shown in Fig. 2 its holes register with the holes of the sieve, while in the other position shown in Fig. 1 the slide closes the holes of the sieve. Any known means could be provided for moving the slide in either direction relatively to the casing.

The casing, which is provided with feet standing on the bottom of a tank, may be stationary and the machine carrying the two rollers may be arranged for longitudinal motion, so as to remove the two rollers with the skein into and out of the space of the slide. The casing may be connected with a tank above by means of a tube and a valve or the like. A pump may be provided for raising the liquid from the tank below and discharging it into the tank above.

THE DYEING OF COTTON DUCK

BY LOUIS J. MATOS, Ph. D.

The dyeing of heavy cotton fabrics involves both chemical and mechanical difficulties. In the dyeing of heavy shades and black the greatest obstacle is the difficulty of securing perfect penetration of the cloth. If the cloth is not dyed through and through, the goods possess little value for certain purposes. The first consideration in dyeing cotton fabrics is to give the gray cloth proper preparation in order that whatever dyeing process may be adopted, the dye will have a clear bottom to work upon. The clearer and cleaner the fabric, the brighter and fuller the resulting shades will be. Very cheap fabrics may not permit of perfect preparation, consequently, thin and hungry, not to mention uneven shades may result. Where medium and good grades of goods are to be dyed, even shades with good penetration, the following method is recommended:

Singeing: If the goods are faced, singeing should never be omitted, because if any fluff appears on the surface of the fabric, it greatly influences the depth and brilliancy

of the colors wanted, whatever dyestuffs may be used.

Wetting-out: Some classes of goods are greatly benefited by giving them a thorough wetting-out before dyeing, this applies particularly to fabrics that are not bowked. The wetting-out liquor is made up in the following manner, the quantities being per 100 gallons of water; from 1/2 to 2 pounds of soda ash, and 1 to 2 pounds of soluble oil are dissolved separately in a small portion of the water. When solution is complete, it is added to the main portion. The goods are given several passages through this solution in a jig or by making use of a circulating kier. The strength of this wetting-out liquor is regulated by the apparent amount of dressing on the goods, which latter also determines how much time should be given for the operation. For high grade fabrics, however, a good bowking will be found most desirable after the singeing, thereby ensuring the saponification of all grease in the pieces. For this purpose, the use of caustic soda lye or ash may be employed in the kiers, and advantageously under pressure. After this treatment, the goods are well rinsed, soured afterwards, well washed to get rid of every vestige of acid, even with the aid of a little soda if necessary, when the goods are ready for dyeing.

Should the goods contain starch dressing, such as some kinds of heavily sized twills, malting is advisable. The immersion in the malt bath may continue for several days in large cisterns filled with warm water, the fermentation of the starch being helped with about a pound of commercial malt preparation to each 100 gallons of water. This treatment is followed by a good rinsing when the fabrics are ready for dyeing.

It is becoming a common practice in some mills to malt the goods in the jig or padder. The malt solution is made up and heated to 160° F., through which the cloth is run several times and afterwards allowed to lie for several hours or over night on the shell. In the morning the cloth is made ready for dyeing by giving it a couple of passages or runs through warm water.

As a rule, heavy twills and similar fabrics are mostly dyed on the jig and the more perfect the preparation, the better will the result of the dyeing be. The usual method for dyeing on the jig is with the direct colors. The deeper the shade desired, the greater the concentration of the dye bath. Standing baths are of so little interest in jig work that their use is of no importance.

According to shade, the dye bath is made up with water containing, per 10 gallons, 1 to 4 ounces of soda ash, 5 to 20 pounds of crystal Glauber's salt, and the necessary amount of dyestuff. For very heavy shades, the Glauber's salt is not added at the start. The bath being ready, one-half of the quantity of dyestuff is added, and the piece given one run. The remaining half of the dyestuff is added and the cloth given four or more passages at the boil, during which the Glauber's salt is added. Heavy goods always require the addition of 2 to 3 quarts of soluble oil to the dye bath of about 75 gallons for a roll of from 200 to 300 pounds of cloth.

Some dyestuffs possessing good solubility are easily dyed upon thin or loosely woven goods, and do not require penetrating assistants, but heavy cotton goods, irrespective of the solubility of the dyestuff, always require soluble oil in the bath.

Much heavy duck is dyed black, being used for boot linings and other articles of manufacture, and consequently must retain, when dyed, the full strength and wearing qualities of the grey goods. It therefore devolves upon the dyer to employ such dyeing methods as will give the desired fullness of the black without any undesirable overtones, at the same time retaining the strength of the fabric.

Five methods are available for dyeing this class of goods, viz.: Logwood black; aniline black; diamine or direct blacks; diazotized and developed blacks and sulphur or immedial blacks. The first method is out of the question. Aniline black has the disadvantage of weakening the fiber, due to method of dyeing, which for heavy fabrics is not easily controlled. The diamine or direct blacks are the cheapest and most direct to employ, and can under no circumstances injure the cloth. The diazotizable blacks, when proper combinations are used, yield shades rivaling ani-

line black in depth and brilliancy, but at a slight increased cost. It is occasionally asserted that the diazotizing operation of this process has a slight tendering action upon the cotton, but this has been disproved so many times that reference to it is unnecessary. Of curse, if the dyed and diazotized fabrics are allowed to lie around the dyehouse for an indefinite time without washing, there is a possibility of the fiber weakening, but in a well regulated dyehouse this is not possible.

The sulphur colors are of great importance, owing to the fact that they are always dyed from a distinctly alkaline bath, which insures penetration, and fullness and brilliancy according to the dye selected. When such blacks are dyed and subsequently aftertreated with acetate or formate of soda, fiber weakening is out of the question. The production of a full rich black with the direct colors requires that preliminary trials should be made in the laboratory to get the proper shade. The colors should be fed in the jig until the proper depth is obtained.

Heavy ducks require several runs through wash water after being dyed, so as to remove the last traces of the dye that remain, and also the small amounts of salt.

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Dye Recipes

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 61

YELLOW ON WORSTED YARN

Tartrazine on worsted yarn. Prepare the dye bath with

2 lbs. Tartrazine.
(Innis Speiden & Co., 46 Cliff St., New York.)
20 lbs. Glauber's Salt.
2 lbs. Sulphuric Acid.

Enter at 140° F. and dye at a boil for one hour.

Tartrazine possesses excellent fastness to light and washing.

Recipe No. 62

BLUE ON COTTON YARN

Direct Blue G O on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Direct Blue G O.
(Innis Speiden, 46 Cliff St., New York.)
20 lbs. Common Salt.

Enter at 160° F. and dye at a boil for one hour.

Direct Blue G O possesses the properties characteristic of the direct cotton colors.

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Recipe No. 63

RED ON WORSTED YARN

Acetyl Red G X on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Acetyl Red G X.
(Badische Co., 86 Federal St., Boston, Mass.
15 lbs. Glauber's Salt.
4 lbs. Sulphuric Acid.

Enter at 140° F. and dye at a boil one hour.

Acetyl Red G X possesses good fastness in nearly every respect.

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Recipe No. 64

BLACK ON WORSTED YARN

Amnie Black 4 B L on 100 lbs. worsted yarn. Prepare the dye bath with

6 lbs. Amnie Black 4 B L.
(Berlin An. Wks., 213 Water St., New York.)
10 lbs. Glauber's Salt.
2 lbs. Acetic Acid.

Enter at 120° F., bring to boil and after boiling 3/4 of an hour add

2 lbs. Sulphuric Acid

to exhaust the bath.

Amnie Black 4 B L possesses good fastness in nearly all respects.

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Recipe No. 65

YELLOW ON COTTON YARN

Chlorazol Fast Yellow F F on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Chlorazol Fast Yellow F F.
(Read Holliday & Sons, 11 Gold St., New York.)
20 lbs. Common Salt.

This is dyed in the same manner as the other direct cotton colors manufactured by this firm.

Chlorazol Fast Yellow F F is very fast to light, washing, alkalies and scrooping.

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Recipe No. 66

BLACK ON COTTON YARN

Diazo Black o 2 G on 100 lbs. cotton yarn. Prepare the dye bath with

6 lbs. Diazo Black o 2 G.
(Farbenfabriken & Co., 117 Hudson St., New York.)
40 lbs. Glauber's Salt.
2 lbs. Soda Ash.

Enter at 180° F. and dye at a boil for one hour. Rinse and diazotize in a cold bath made up with

2½ lbs. Sodium Nitrite.
7½ lbs. Hydrochloric Acid, 32° Tw.

Then develop in a cold bath made up with

1½ lbs. Developer A.

Rinse and soap at a boil.

Diazo Black o 2 G possesses very good fastness to washing, acid, and alkali.

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Recipe No. 67

YELLOW ON COTTON YARN

Chlorazol Fast Yellow Y on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Chlorazol Fast Yellow Y.
(Read Holliday & Sons, 11 Gold St., New York.)
20 lbs. Common Salt.

Chlorazol Fast Yellow Y is dyed in the same manner as the other direct cotton colors manufactured by this firm. It is very fast to light, washing, alkalies and scrooping.

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Recipe No. 68

SCARLET ON COTTON YARN

Diamine Azo Scarlet 2 B L Extra on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Diamine Azo Scarlet 2 B L Extra.
(Cassella Color Co., 182 Front St., New York.)
40 lbs. Glauber's Salt (Crystal).

Enter at 180° F. and dye at a boil for one hour, then rinse in cold water and diazotize in a bath made up with

4 lbs. Sodium Nitrite.
4 lbs. Sulphuric Acid.

Work in the above bath for twenty minutes, then rinse and develop by working for twenty minutes in a cold bath made up with

1½ lbs. Beta Naphthol,

dissolved in the necessary amount of caustic soda.

Diamine Azo Scarlet 2 B L Extra gives an excellent shade of scarlet, with good fastness to washing.

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Recipe No. 69

GREEN ON WORSTED YARN

Salacine Dark Green C S on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Salacine Dark Green C S.
(Kalle & Co., 530 Canal St., New York.)
10 lbs. Glauber's Salt.
2 lbs. Acetic Acid.

Enter at 120° F., bring to a boil in 1/2 hour, boil 1/2 hour and add

2 lbs. Acetic Acid.

Continue the boiling 1/2 hour longer and add, after cooling down to 158° F.,

1½ lbs. Potassium Bichromate,

and boil 3/4 hour longer.

Salacine Dark Green C S possesses excellent fastness in most respects.

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Recipe No. 70

BORDEAUX RED ON COTTON YARN

Naphtamine Fast Bordeaux B G on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Naphtamine Fast Bordeaux.
(Kalle & Co., 530 Canal St., New York.)
20 lbs. Glauber's Salt.
2 lbs. Soda Ash.

Enter at 180° F. and dye at a boil for one hour.

Naphtamine Fast Bordeaux possesses excellent fastness for a direct cotton color, especially to light, acids, and rubbing.

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Recipe No. 71

RED ON WORSTED DRESS GOODS

Red on 100 lbs. worsted dress goods. Prepare the dye bath with

1 lb. 12⅘ ozs. Amazo Violet 4 R.
1 lb. Amazo Fast Red 8 B.
(American Dyewood Co., 80 Maiden Lane, New York.)
20 lbs. Glauber's Salt.
2½ lbs. Oil of Vitriol.

Start at 120° F. and raise to a boil in 20 minutes. Boil 1 hour and rinse.

The colors used in producing this shade are noted for their excellent leveling properties and satisfactory fastness to light and fulling.

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Recipe No. 72

TAN ON WORSTED DRESS GOODS

Tan on 100 lbs. worsted dress goods. Prepare the dye bath with

56 grs. Amazo Blue.
1 oz. 244 grs. Amazo Brill. Red 2 B.
8 ozs. Amazo Fast Yellow L R.
(American Dyewood Co., 80 Maiden Lane, New York.)
15 lbs. Glauber's Salt.
1½ lbs. Oil of Vitriol.

Enter at 120° F. and raise to boil in 20 minutes. Boil 3/4 to 1 hour. Rinse.

The colors used in the producing of this shade are noted for their level dveing properties. They are very satisfactory for fastness to light.

New Machinery and Processes

This department is designed to present from month to month a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to the textile manufacturers. It is not a list of patents but of improvements on the market, the idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.

Whenever possible we endeavor to make a personal investigation of the new machinery and processes described in this department. In the absence of such personal investigation we must necessarily rely upon information obtained from those who control the machines and processes.

We invite machine builders and others to send us such information for this department.

Yarn Cleaner. The Jennings Yarn Cleaning Machine Co., Elmira, N. Y. A machine for removing specks, lumps and other foreign matters from yarn. A description will be found in this issue.

Loom Temple. Lupton Bros., Accrington, England. An improved loom temple for cotton looms, which, it is claimed, holds the cloth within one-half inch of the full width in the reed.

Raw Stock Drying Machine. Harry Heymann, Bradford, England. An improved drying machine for raw stock which operates on the tray system.

Perforated Spools for Dyeing Machines. Rugendas & Cie, Augsburg, Germany. An improved method of perforating tubes for spools used in circulating dyeing machines. The perforations are connected by grooves so as to facilitate a distribution of the liquor through the material.

A Cylinder Grinder for Cards. Dronsfield Bros., Oldham, England. A machine for grinding the card cylinders in order to obtain a perfectly true surface before the clothing is applied. Important advantages are claimed for this method.

Dyeing Machine. Whittaker & Pendlebury, Bradford, England. An improved machine for dyeing slubbing, yarn, warps, hosiery, rags and raw stock.

Cloth Measuring and Winding Machine. J. T. Hardaker, Bradford, England. A machine for winding and measuring cloth. It is especially adapted for measuring and rewinding cloth for purposes of stock taking. A paper tape showing the length of the piece is wound in the roll of cloth.

Flyer. The Elsaessischen Maschinenbau-Gesellschaft, Muelhausen, Germany. An improved flyer which is said to be capable of giving a large production of very uniform roving.

Mill Sewing Machine. The Curtis Machine Supply Co., 11 Pine St., Providence, is putting on the market a machine for use in the cloth room of cotton and woolen mills, bleacheries and dye works. They lay special stress upon their method of adjusting the hook or looper to the needle to give a perfect stitch, also on the adjustment to take up any lost motion in the gears by an eccentric stud, which stops all back lash that may be caused by the wearing of the gears.

Cloth Testing Machine. Edward G. Herbert, Ltd., Manchester, England. An improved machine for testing the strength of cloth.

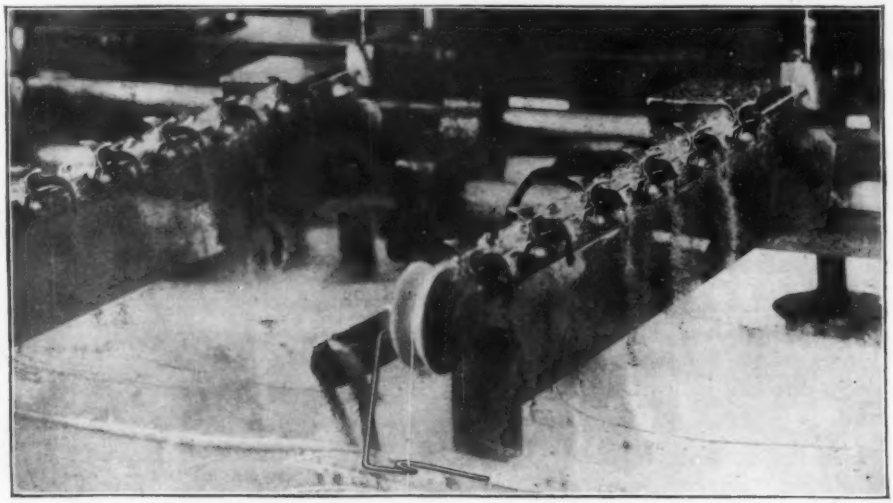
Winding Motion for Cards. Saechsische Maschinenfabrik Rich. Hartmann, Akt.-Ges. Chemnitz, Germany. An improved device for winding the roping from the finishers to individual spools, each spool having one end of roping wound on it.

Dyeing Process. J. P. Bemberg, Barmen-Rittershausen, Germany. A process of dyeing cloth in the open width to give different shades on face and back.

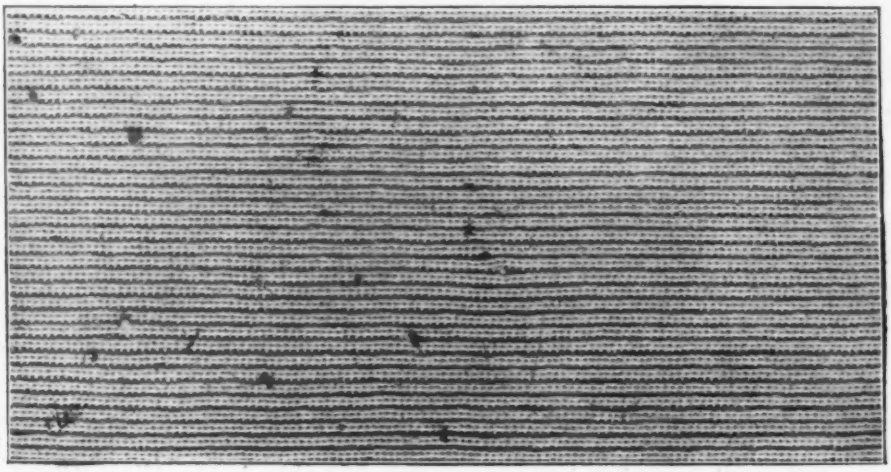
Beam Weighting Device for Looms. Easie Loom Weighting Co., Colne, England. A device for weighting the friction chain or straps on loom beams. The sliding weight is placed on only one lever which is connected by chains with a lever at each end of the beam and to which the friction straps are attached.

THE JENNINGS YARN CLEANING MACHINE

The new yarn cleaning machine, shown in the accompanying illustration, is manufactured by the R. G. Jennings Yarn Cleaning Machine Co., Elmira, N. Y., removes specks, lumps and other foreign matter from yarn. This machine grips and detaches the speck or lump from a running thread of yarn as one would remove it with the fingers, and is believed to be the first machine ever made to clean yarn in this way. The inventor has been granted a basic patent in this and foreign countries covering means for removing foreign matter from a running thread of yarn by a gripping process. These cleaners clean so well that in making knit underwear, hosiery or cloth intended to be dyed or made up in the grey, it is unnecessary to bleach the goods or use

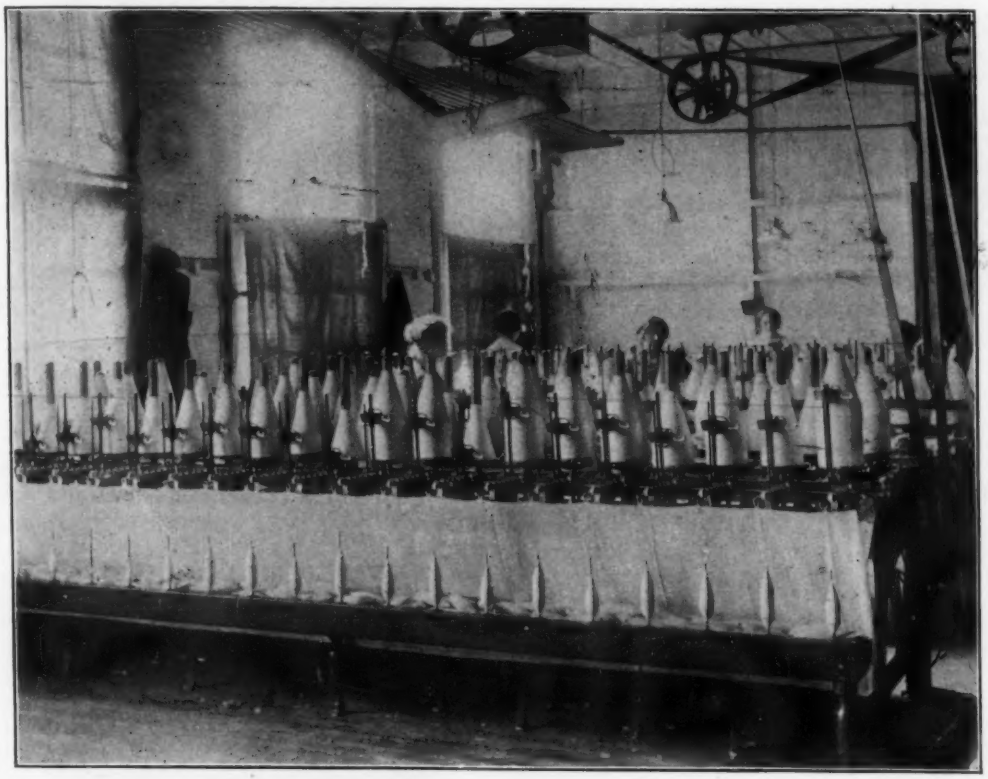


A SINGLE SECTION OF THE JENNINGS YARN CLEANING MACHINE ATTACHED TO WINDER.



THE LEFT HAND END OF THIS PIECE OF FABRIC WAS KNIT FROM YARN WHICH HAD NOT BEEN CLEANED; THE OTHER END FROM YARN CLEANED BY THE JENNINGS MACHINE.

combed yarns to get rid of the specks. As a result a very large saving is effected. It is also claimed that a lower and cheaper grade of cotton can be used in yarns cleaned by these machines, and that yarns so cleaned are improved in quality and knit or weave with less trouble and fewer holes, edges, and so form V shaped slots, in which the specks are caught. At intervals the blades are lifted slightly from the beds, allowing the foreign matter which has been caught to feed down into the speck bag below. The blades are bent away from each other at the top so that the operator has



THE JENNINGS YARN CLEANING MACHINE APPLIED TO WINDERS.

thus making a large saving in seconds and cost of cutting.

The machines are attached to any kind of winder and are used in the regular process of winding or spooling. The yarn is controlled by regular tensions and guides, and passes between thin curved sickle shaped pieces called blades. These blades are placed in pairs and rest on curved bed pieces which are adjustably mounted on a frame piece at regular intervals. The yarn as it passes between the blades touches the beds. The beds are adjusted so that the blades touch them only at their forward only to place the yarn between the porcelain tension discs at the outward end of the frame, and then into the guide at its inner end. The yarn will then slip down between the blades automatically. An operator can tie up the ends as fast, when winding through this cleaning attachment, as she could in the old way. The blades are provided with means for moving them together or apart, so as to accommodate different sizes of yarn and do away with unnecessary friction. These machines are very carefully made of good steel, nickle plated to avoid rust, and all working parts are hardened.

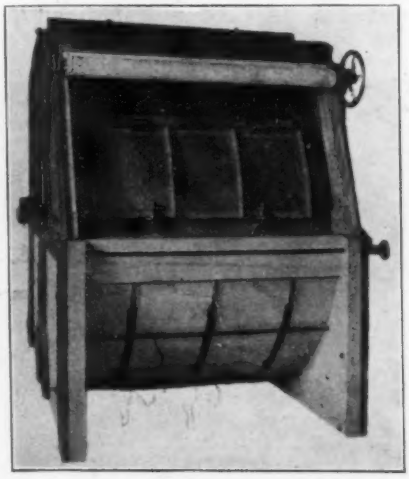
They are furnished completely equipped with the necessary castings, cop box legs and speck bag, ready for attachment to any bobbin or cone winder. A number of installations have been made in prominent mills, and all who have seen these cleaners working have pronounced them a wonderful success.

A NEW DYEING MACHINE

The dyeing machine for hosiery, fine wool and wool hats, shown in the accompanying illustrations, was exhibited for the first time at Philadelphia by the Klauder-Weldon Dyeing Machine Co., Amsterdam, N. Y. This machine is the invention of John H. Giles, vice-president and general manager of the Klauder-Weldon Co. and was built in response to a request from one of their customers, who wished to get a machine that would dye ladies' sheer hosiery evenly. It provides for the dyeing of hosiery, both men's and women's, of the sheerest texture, without the least possibility of tangling or roughing up. So efficient is the machine in this respect that they do not singe the stockings after they are dyed and dye them right side out. This fact eliminates from the cost of manufacture the expense of two turnings and one singeing, a saving in labor which is estimated at not less than 3 cents per dozen.

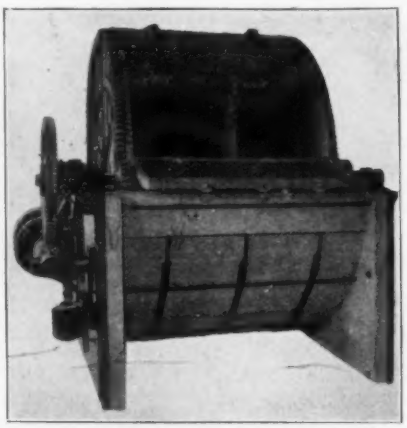
The reel of the machine is constructed with five pockets, having a knee-shaped bottom which prevents the rolling of the goods as the reel revolves, yet causes sufficient agitation to properly open them up. Each pocket may be subdivided by partitions rendering possible the dyeing of several sizes in separate compartments, thus avoiding considerable labor and confusion in sorting the goods. The machine is practically indestructible. It consists of a tub of 3-inch Georgia pine, being set in heavy metal side frames. The tub is held together by heavy metal cross rods and bands on the outside. The driving gear can be placed on either side of the tub and is a new invention. It is a change speed gear drive, having two forward speeds and one reverse.

The gears are enclosed in a self-oiling case and the operation is noiseless. The drive operates the reel from the back by means of pinion gears which mesh into segment gears on both ends of the reel. By



THE KLAUDER-WELLON DYEING MACHINE

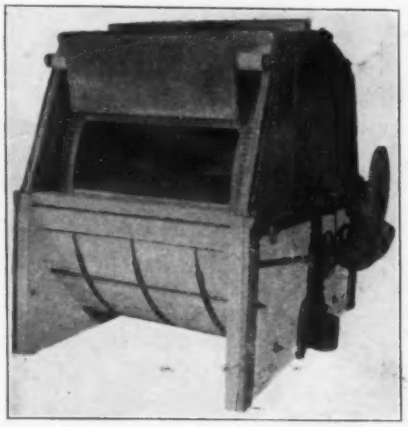
this means all strain of driving is taken from the reel shaft. There is also a waste gate operated by a lever that can be located in



MACHINE IN POSITION FOR LOADING

either end of the bottom of the tub. Within the tub is a perforated copper feed and steam pipe that distributes the feed and steam equally to the machine. The reel is constructed of heavy high grade bronze and nickel with the pockets divided by perforated

nickel sheets. The top is of wood set in metal side frames and is held together by metal cross bolts on the outside. There are canvas curtains, front and back, which can be lowered, thereby keeping the steam out of the dye house. For sulphur dyeing the



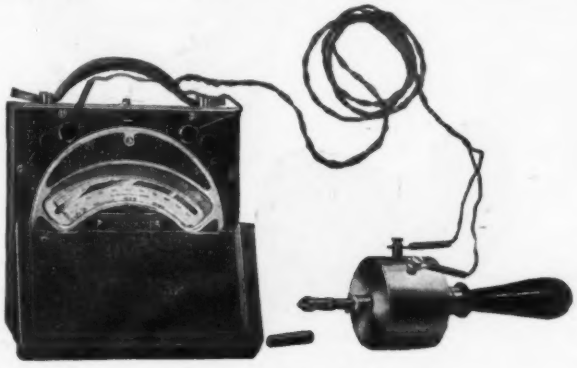
MACHINE IN POSITION FOR UNLOADING

machines are constructed entirely of iron. the tub, reel and top being of heavy cast iron and the fittings of malleable iron. As an evidence of the satisfactory work of the machine, one buyer paid for it in 30 days notwithstanding it had been installed on 60 days' trial. A further field for this machine is in the dyeing of fine Cape wool without the danger of felting, also among the makers of wool and fur hats. The trial of one of the machines in a hat factory at Reading demonstrated the correctness of Mr. Giles' opinion that the machine would give thorough penetration and even dyeing. The machine is patented, the latest patent having been granted Mr. Giles on April 1st.

THE ELECTRIC TACHOMETER IN TEXTILE MILLS

During the last few years much attention has been given by a number of foreign and American manufacturers to the development and perfection of the electric type of tachometer. Because of the ability of the electric tachometer to operate at a distance from the rotating shaft or machinery, many new and exceedingly interesting applications of the tachometer to the various industries have been inaugurated with marked economic results.

In the matter of generator and motor testing, it is of importance to obtain simultaneous reading of volts, amperes, watts and revolutions per minute. In order to obtain readings simultaneously, it is very desirable indeed to have all instruments upon the same instrument table and immediately under the eyes of the observers. During the din and racket of a large electrical and mechanical test where several observers are necessary, the shouting of figures from one part of the test floor to the other, necessary to form a part of simultaneous data, not only leads to confusion at times, but often to misunderstandings and errors in results. It is only through the use of electrical tachometers that such important tests can



THE HOPKINS ELECTRIC TACHOMETER

be carried on to best advantage. This point will readily be appreciated by those accustomed to make tests upon steam turbo-generators and other electrical machinery.

Prominent among other applications of tachometers where indications at a distance are of prime importance, are tests between the engine room and the bridge of steamers, warships, motor boats and yachts. With a scientifically constructed electric tachometer, perfectly compensated for temperature changes, it is perfectly safe to rely upon its indications for navigating during periods of foggy weather, and to maintain the proper distance between the ships of a battle squadron by signalling the number of revolutions per minute which it is desired to maintain. Within the last few years many of the Government naval vessels have been equipped with electric tachometers attached to each propeller shaft with indicators both in the engine room and on the bridge.

THE ELECTRIC TACHOMETER

Among some of the most novel and interesting applications of electric tachometers to the industrial arts may be men-

tioned the attachment of tachometers to printing presses, the scales of the instrument being printed and calibrated to read into "newspapers per hour." In this case the actual "flow" of papers passing through the press may be indicated or recorded at any distance from the printing machinery and in any office or room of the plant.

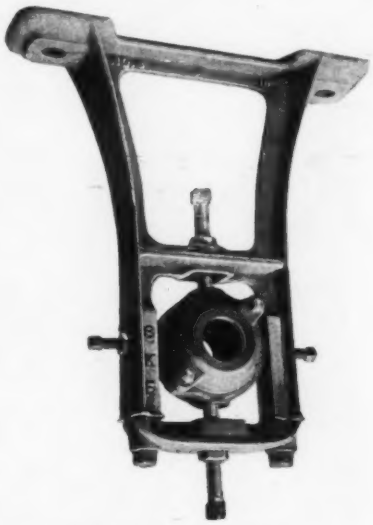
Another novel application has been in attaching electrical tachometers to the automatic stokers in large boiler installations of power plants, where the rate of feed of coal in "pounds per minute" or in any other convenient units may be indicated or recorded at any desired position in the plant.

Rapid recognition of the importance in knowing speeds of machinery in the industrial productive arts may be seen in cotton and general textile mills, paper-making mills, where not only sustained speed is of economic importance, but where unvarying speed is of the greatest vital importance in securing uniformity of the product. If a mill engine or its system of counter shafting falls off in r. p. m. say 5 per cent. during any one year, due to belt slippage or any other cause, there will be in many cases a corresponding decrease of output from the mill during the working hours of the day. In order to hold the production up to the previous rate of output, it will be necessary to know the loss of speed and tighten the belt, or to look up the other possible causes, to run the mill more hours upon certain days or extra days during the year. This loss in inefficiency in production is easily overlooked and often continues for months and years without attracting attention. If an engine is regulating badly and the speed of the plant is not uniform, there are many industries apart from cotton spinning and textile mill work in general, and paper making as enumerated, where the product will not run uniformly in quality, weight or thickness.

The Electric Tachometer Company of Philadelphia has recently installed its modern and thoroughly equipped plant at the southeast corner of Broad and Spring Garden Sts., and manufactures a complete line of tachometers for all scientific and industrial purposes and maintains a staff of engineers for giving individual attention to the special needs and requirements in this branch of instrument engineering. It publishes an interesting series of technical bulletins, containing useful information in the art of modern tachometry.

THE S. K. F. BALL BEARING HANGERS

The S. K. F. Ball Bearing Company, 50 Church St., New York, are now placing upon the market a new type of ball bearing line shaft hanger. This hanger is strongly and simply designed. The box containing the self-aligning ball bearing is suspended in the hanger frame on four adjusting screws,

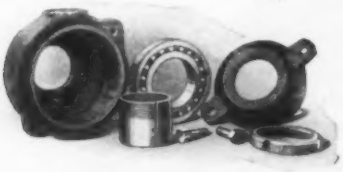


THE S. K. F. DROP HANGER

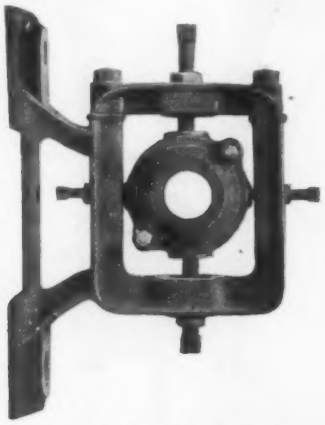
providing for lateral and vertical adjustments. The boxes are made in a single piece, accurately machined for the reception of the ball bearings and provided with a suitable face cap, the assembled box forming a large lubricant chamber with grooves adjacent to the shaft for the retention of the lubricant. The ball bearings themselves provide the alignment feature within the hanger box. The outer race is ground in the form of a sphere, whose center is at the

center of rotation of the bearing, and the inner race and double row of balls act within this spherical race in a manner similar to the familiar ball and socket joint.

In case of a shaft springing under a load, the bearings adjust themselves to the deflection at the same time maintaining for the balls a uniform circle of rotation. The bearing is of the familiar S. K. F. self-aligning type fitted with an adapter. This consists of a taper sleeve and locking nut which secures the bearing rigidly in position on the shaft.



PARTS OF THE S. K. F BEARINGS



THE S. K. F. POST HANGER

In these hangers the waste of power ordinarily found in plain journals is entirely avoided by the elimination of rubbing friction.

A series of careful experiments has established the fact that the amount of power that may be saved by operating line shafts on ball bearings will range between 60 and 90 per cent. of the power required to drive the shafting alone.

The various causes of friction in line shafting are:

1. Misalignment.
2. Lack of proper-lubrication.
3. Insufficient protection of the bearings against the intrusion of grit or shop dust.
4. Heavy belt tension on the driving or service pulleys.

These conditions vary widely in the different shops, but the four above mentioned are the most general causes of power waste.

In point of efficiency, the ball bearing has an advantage over a plain journal in the ratio of approximately 15 to 1. The coefficient of friction of a ball bearing is practically uniform at all speeds. The strain on the power house on starting up a factory line shaft is, therefore, reduced to a minimum by the employment of ball bearing hangers.

THE S K. F. PILLOW BOX

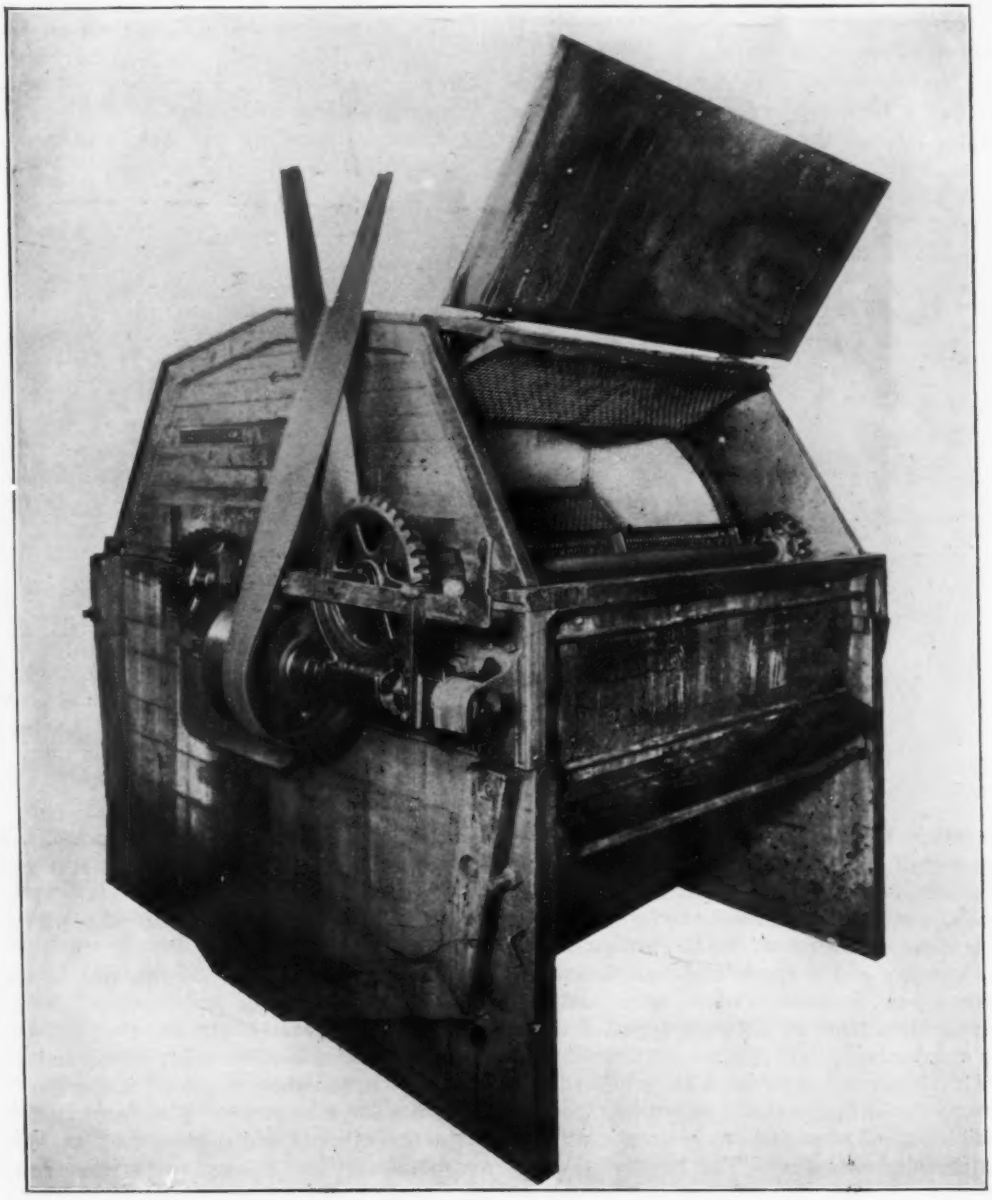
While ordinary line shafts operate at speeds anywhere from 100 to 300 r. p. m and are usually limited to these speeds, shafts running in S. K. F. ball bearing hangers may safely be run as high as 600 to 1,000 r. p. m. without danger of heating, and with a very considerable reduction of pulley sizes, shaft sizes and weights, and a consequent reduction of belt sizes and costs.

S. K. F. ball bearing hangers also reduce the lubrication required. The reason for this is the fact that ball bearings require lubrication only at infrequent intervals, and the construction of the bearing boxes in the S. K. F. hanger frames is such that the leakage of lubricant is done away with. This factor besides affecting a saving in the amount of lubrication used, introduces a large saving in the maintenance costs.

The S. K. F. ball bearing company have issued a special pamphlet describing their self-aligning ball bearin hangers in detail, giving lists and other information.

AN IMPROVED HOSIERY DYEING MACHINE

The machine shown in the accompanying illustration is built by Smith, Drum & Co., Coral and Cumberland Sts., Philadelphia, Pa., and has been especially designed for dyeing the finest grades of hosiery. It combines the soundest principles of construction and operation, namely the rotation of the goods in the cylinder and the circulation of the liquor through the goods in two directions. The liquor flows through the goods



THE SMITH, DRUM HOSIERY DYEING MACHINE

in one direction when the cylinder is in a certain position, while the current of the liquor during each revolution is reversed to the opposite direction when the cylinder occupies another position.

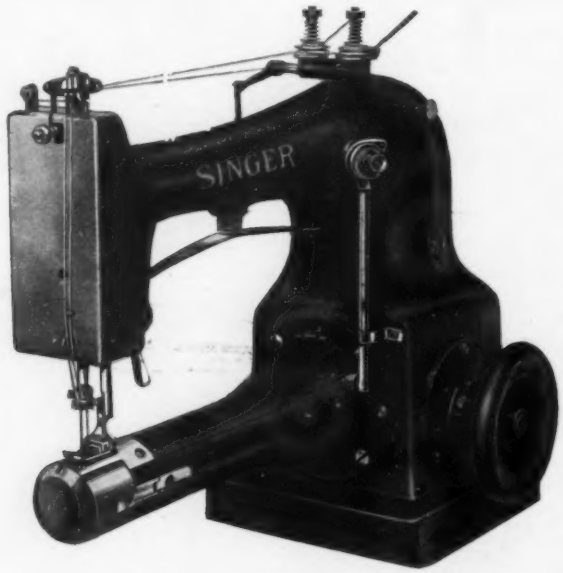
This type of machine can be depended upon for the successful dyeing of hosiery and especially for the finer grades of hose. It will dye evenly and not roughen the hosiery, the reel revolving very slowly and the paddle at a higher speed, circulating the dye liquor through the goods. The goods in this machine are not tangled or roughened on account of the slowly revolving cylinder, but are evenly dyed by rapid circulation of the dye liquor. The machines are in successful operation in several of the largest plants in the country and a number of manufacturers have given duplicate orders after making comparative tests of different types of dyeing machines.

This improved machine was exhibited by Smith, Drum & Co. at the recent knit goods exhibition and attracted much attention from hosiery manufacturers. The builders report an active demand not only for the improved hosiery machine, but for their other lines, which include machinery for dyeing, singeing and finishing hosiery, also power screw presses and mercerizing machines.

—:—

A NEW SINGER MACHINE FOR SEAM COVERING

The illustration shows the improved machine, No. 86-1, sold only by the Singer Sewing Machine Co., for high speed seam covering on knit underwear of all kinds. It is suited for handling any weight of goods, from the heaviest of fleeced goods and winter ribs, to the lightest of Swiss ribs and balbriggans and other knit goods. It is capable of a large production of work of excellent quality.



SINGER MACHINE NO. 86-1 FOR OVEREDGE SEAMING

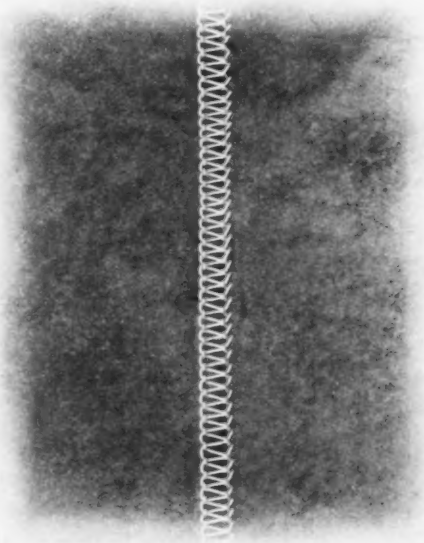
The quick response of the machine to the action of the starting and stopping lever, whereby it instantly attains the highest speed when the foot lever is pressed and as suddenly stops when the foot is removed, gives it a large capacity. The construction of the throat plate and presser foot, enables an operator to make short turns when running at the highest speed.

All working parts are inclosed, which

thoroughly protects the mechanism and prevents oil from reaching the outside of the machine, and all parts may be easily reached for the purpose of cleaning and oiling; a sub-base is provided to receive surplus oil. The cap which covers the looper at the front end of the cylinder may be pulled out and swung back on its hinges, but is not liable to accidental removal from the machine. The absence of vibration is noticeable, particularly when the high speed at which the machine is operated is taken into consideration. No special benches nor frames are necessary to fasten it down. Much thought has been given to the safety and convenience of the operator. The hand wheel at the side stops as soon as the machine starts. The belt is at the back and cannot soil the goods. Substantial in construction, finished in the best possible manner with the most careful attention to mechanical detail, this machine is recommended as the highest development in the line for which it is intended.

METALINE BEARINGS

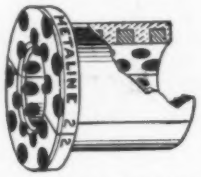
The illustrations show parts of the metaline oilless bearings manufactured by the Metaline Co., Long Island City, N. Y. Metaline is a solid lubricant and bearings fitted with this material run without any other lubrication. It is composed of metallic oxides and other substances reduced to an impalpable powder and then solidified in hardened steel moulds under great pressure into short length cylindrical plugs, 3/16 inch, 1/4 inch, 5/16 inch in diameter. These plugs are inserted into flat bottom holes, drilled into the bearing surface of divided bushings or boxes of gun metal bronze, phosphor bronze, or composition metal of good quality, in such a manner as to adequately supply the required lubrication.



INSIDE OF SLEEVE OVERSEAMED ON SINGER MACHINE NO. 86-1

The principle of operation is the coating of both surfaces in bearing contact by filling their microscopic interstices with particles of the dry lubricant material, thus producing a degre of polish unattainable in any

metal by mechanical methods. Instead of attempting to keep the comparatively rough metal surfaces apart by a film of oil or grease, these surfaces are uniformly built up to the level of their highest points, thus

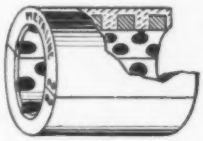


FLANGED BUSHING, SHOWING PLUGS IN THE FLAT BOTTOM HOLES

producing smooth faces, which moving contact will continue to improve.

For very light loads and slow speeds, unflanged bushings may be made of the Metaline powder compressed in hardened steel moulds to finished dimensions, provided the wall of bushing is not less than 1/16 inch thick; but these bushings can be used only for sizes less than 1 inch internal diameter and under favorable conditions. The most satisfactory results are obtained by the plug method.

As shown by the illustrations the plugs must overlap, or break joints, particularly



UNFLANGED BUSHING, SHOWING THE PAIRING NUMBERS ON THE END

along the line of motion, the shaft revolving in the fixed or stationary box or bushing, or the box or bushing revolving around the shaft, which may be stationary or in motion, so that there will be a complete protection against abrasion of the rubbing surfaces.

After the Metaline plugs have been inserted in the flat bottom holes drilled to receive them, and tapped so that they rest firmly at the bottom of the hole, they are then filed finished flush with the surface of the bearings.

The castings of the box or bushing have been made in halves, are planed and soldered together and machined to specified finished dimensions, numbered for pairing or mating, then separated and holes drilled into the inner or bearing surface—not all the way through the wall of the bushing—into which the Metaline plugs are inserted and finished. It is necessary that the two halves of the divided bushing be correctly paired or mated, as indicated by their corresponding numbers, to insure the required inside and outside diameters throughout its entire length. Only in exceptional cases is the sleeve or unsplit type of bushing used, with the plug holes drilled entirely through its wall, as the split or divided bushing is considered a superior mode of application.

The Metaline bearings give excellent results for tackle block, wire, rope and tram-

LOOSE PULLEY WHEN FITTED WITH METALINED BUSHES ABSOLUTELY RUNS WITHOUT OIL
USED ALSO FOR SHAFTING BOXES PULLEY BLOCK WIRE ROPE & ELEVATOR SHEAVES &c

A LOOSE PULLEY AFTER BEING FITTED WITH A SET OF TWO METALINED FLANGED BUSHINGS

way sheaves, loose pulleys, friction clutch pulleys, idler and mule pulleys, elevator pulleys, line and counter-shaft boxes, floor stand boxes, ventilating fans and small motor bearings. If after a number of years of constant use the Metaline becomes worn below the bearing surface the old blocks can be replaced with new ones, thus prolonging the life of the bearings. One of the largest cotton mills in New England has used the loose pulley Metaline bearings for many years and has had some of the bearings remetalined two and three times.

The claims made for the Metaline boxes and bearings may be summarized as follows: They require no oil or other lubricant and will last for years. They are clean and free from many of the objections connected with oil bearings. This is of special advantage in the prevention of oil spots on goods. The bearings are lubricated at all times and there is complete immunity from fire risk. There is no danger from the cutting and injury of the shaft and bearings in case the bearing becomes overheated.

AN IMPROVED GATE VALVE

The extensive use of the "Victor" valve, manufactured by the Lunkenheimer Co., Cleveland, O., and shown in the illustrations, has demonstrated that its durability and efficiency are fully appreciated by steam users. The valves are specified by the leading engineers for use in high pressure power plants. The "Victor" can be made entirely

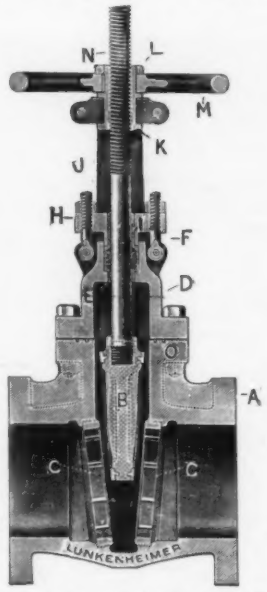


FIG. 1. EXTRA HEAVY PATTERN "VICTOR" GATE VALVE

of brass or with an iron body brass mounted, of puddled semi-steel or cast steel.

Medium pattern brass valves, sizes 2 to 8 inches inclusive, are guaranteed for working pressures up to 125 pounds, and from 9 to 12 inches for pressures up to 100 pounds. Extra heavy brass valves will safely stand 250 pounds pressure. The iron body brass mounted valves are made in standard, medium, heavy and extra heavy patterns; the standard pattern, sizes 2 to 8 inches inclusive, for pressures below 125 pounds, and sizes 10 to 24 inches for pressures up to 100 pounds. The medium pattern has been designed for 125 pounds, the heavy for 175 pounds and the extra heavy for 250 pounds. For high pressures and superheated steam these valves are made of puddled semi-steel, the tensile strength of which is 30,000 pounds, sizes 1 1/2 to 16 inches inclusive. To meet the specifications of engineers who differ as to the metal used for the trimmings, they are made in two combinations. They are guaranteed for working pressures up to 250 pounds.

For extreme conditions of pressure and superheat, the valves are made of cast steel, having a tensile strength of about 80,000 pounds per square inch. They are also made in sizes ranging from 1 1/2 to 16 inches inclusive, and in two combinations, one for pressures up to 300 pounds and the other for 350 pounds. As shown by the illustrations, the valves are made in two forms; one with stationary stem, and the other with outside screw and yoke. The seat rings, as well as the wedge disc, can be

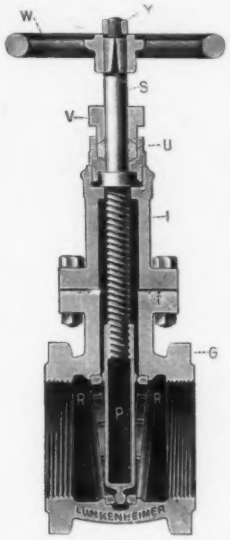


FIG. 2 MEDIUM PATTERN "VICTOR" GATE VALVE

renewed when worn, thus making the valve as good as new.

A very desirable feature in the construction of the valves, is the fact that when finishing the interior of the valve body, that portion which receives the seat rings is threaded to the correct angle of the tapers of the valve disc. The seat rings are threaded and faced off straight, and when screwed in place, they fit accurately to the

tapers of the disc. This makes it possible to renew easily the seat rings, should they become worn or broken, prolonging the life of the valve.

The discs in both forms of valves are made entirely of bronze up to and including the 6-inch size on the medium, heavy and extra heavy patterns, and up to the 3 1/2-inch size on the standard pattern, above which they are made of iron. As the valves are double seated, they will take pressure from either end.

Either pattern of the gate valves can be

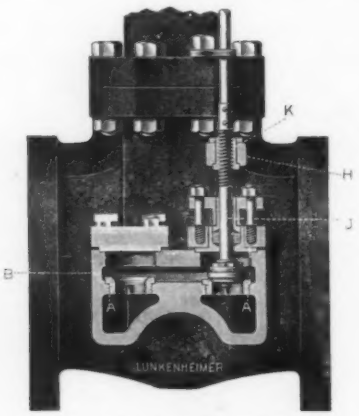


FIG. 3. BY-PASS OF "VICTOR" GATE

packed under pressure when wide open. The stuffing-box in the valve with stationary stem is made of bronze, and is tightly screwed into the hub. In the valves with outside screw and yoke, both the gland and stuffing-box are lined with bronze bushings, which forms a perfect bearing surface for the stems.

The discs are accurately guided in the bodies, and by means of the guides, the stems are relieved of all side strains, which have a tendency to wear out threads. The stems in both forms of valves are made of rolled tobin bronze, a material having the tensile strength nearly equal to that of steel. All parts of the valve are heavy, yet compact, and the strains on the connecting pipes, due to the weight of the valves, are minimized. The valves are not affected to any extent by expansion or contraction.

The joint between the body and hub is worthy of attention, as it is practically indestructible. It consists of grooves cut in the top surface of the valve body, in which are placed seamless copper gaskets. A joint made in this manner will not leak and cannot wear out. The yokes and hubs are rigidly held to the body by large steel bolts, both the heads and nuts of which seat on spot-faced surfaces, insuring even and true bearing surfaces.

The valve can also be had with exterior by-pass, a detailed view of which is also shown at Fig. 3. The by-pass used on the "Victor" valves is not separate from the valve proper, but is cast with the body, as shown. This method has many advantages. The additional metal required for the by-pass tends to strengthen the valve body. Being self-contained, it is not affected by extremes of expansion and contraction, which tend to distort the valves used on exterior by-passes. It will be seen that, instead of the by-pass valve trimmings being screwed into the body, they are bolted thereto, as is also the flange above the reserve valve seat, by a number of large steel studs and nuts, the latter seating on the spot-faced surfaces. The stuffing-box is made of bronze and has a flange on the bottom, which prevents the iron flange above from touching the iron body, and thus prevents the corrosion between these surfaces.

The outside screw and yoke, H, increases the durability of the threads on the steam, J, owing to the fact that they do not come in contact with the steam. The bushing, K, which is threaded to receive the threads on the stem, J, not only prevents corrosion, but also makes it possible to make renewals should the threads become worn. The discs in both forms of by-pass valves are constructed on the same principles as those in the regrinding globe valves, and consequently, they can be reground when worn.

The areas of the by-passes are sufficiently large to admit enough steam around the disc to equalize the pressure on both sides. They are accessible at all times, and the use of a by-pass on large valves, or those of any

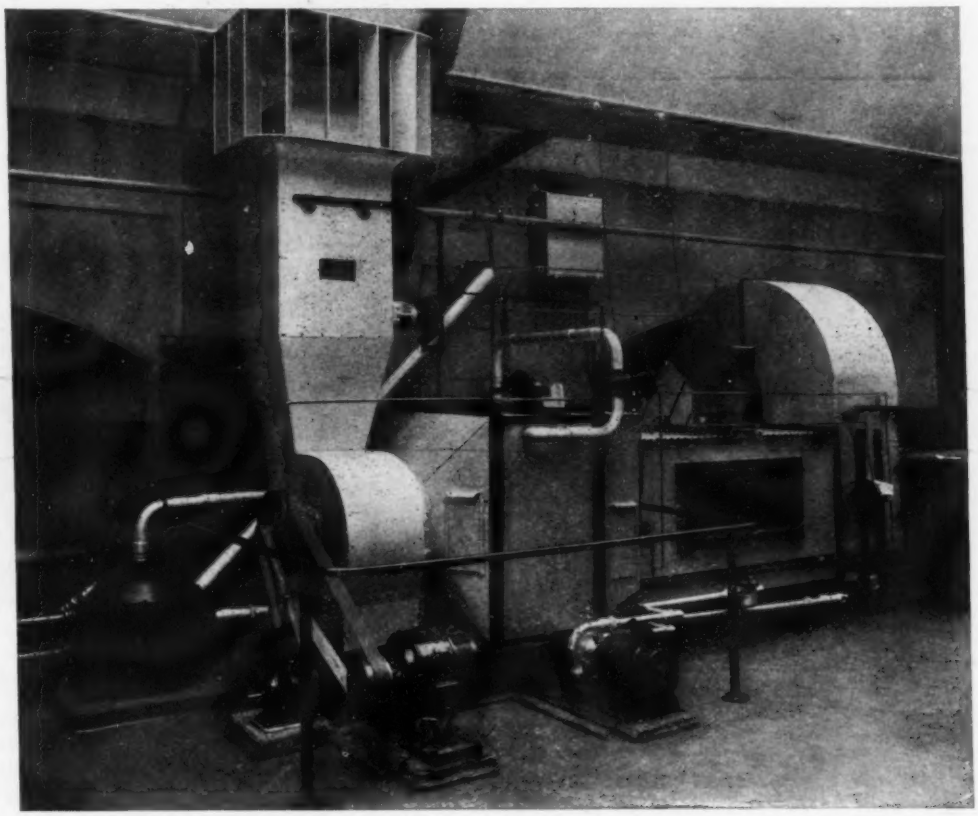
size subjected to high pressures, results not only in making the valves easier to operate, but in largely increasing their durability.

AIR CONDITIONING EQUIPMENT

ROYAL EXCHANGE CONDITIONING HOUSE, MANCHESTER, ENG.

In the testing of cotton yarn at the Royal Exchange at Manchester, it has been found necessary to subject the yarns for testing to uniform humidity and temperature, so that the regain could be held constant and thus give a proper comparison for the different tests and analysis. As this Conditioning House is located in the same building and connected with the Royal Exchange at Manchester, when it was found necessary to procure humidifying apparatus the director thought it best to investigate all of the systems of humidification, including those which were manufactured in England, France, Germany and America.

As soon as it became known that the Conditioning House was to install some apparatus for this work, the director was flooded with offers to install apparatus free of charge, but disregarding these many offers of apparatus being given to the Exchange, and desiring to procure apparatus which would give the best results, he finally awarded the contract of furnishing the apparatus to the Carrier Air Conditioning Co. of 39 Cortlandt St., New York.



THE AIR CONDITIONING EQUIPMENT AT THE MANCHESTER ROYAL EXCHANGE, FURNISHED BY THE CARRIER AIR CONDITIONING CO.

From the second edition of the handbook issued by the Manchester Chamber of Commerce, Testing House and Laboratory, the following extract is taken:

Arrangements have recently been made whereby a specially constructed testing laboratory is now under controlled conditions of humidity. During the past few years, the question of the influence of moisture on yarns and cloths has received some attention from those engaged in textile testing. The extent of this influence on the result of tests has not been very generally realized, however, more particularly as regards the strength testing of yarn and cloth. Recent researches which have been carried out at the Testing House, have shown that a cloth tested for strength on a day when dry atmospheric conditions prevail, may show a result varying to the extent of 18 per cent. from the results obtained when the same cloth is tested on a humid day. Similarly, with regard to counts of yarn, when tested for count in condition received, a 40s yarn has tested 39s on a humid day, whereas the same test portion weighed on a dry day has been found to be 41s. It is therefore obvious that the testing of yarn and cloth cannot rest on a true scientific basis when such variations are ignored as may be accounted for by the moisture in the sample at the time of testing. On the other hand, if tests are always carried out under those conditions of humidity that will ensure the samples containing their natural amount of moisture at the time of testing, the results may have real scientific value. Further, the strict comparison of results obtained on materials tested at different times will be rendered possible.

This plant has been in operation now for several months and we understand that the director is greatly pleased with its operation. The Carrier Air Conditioning Company lately received a photograph of the complete installation as installed which is reproduced here, and they feel very proud of the fact that although their apparatus is the most expensive air conditioning apparatus built, it was selected for this plant.

AN ARKWRIGHT RELIC

This interesting old building in Hanson's Court, Cannon St., now being demolished, was built by Sir Richard Arkwright, the inventor of the spinning frame, whose office in Cromford Court was situated in the same block. Whether this building was used as a mill or simply as a warehouse is not clear; we know that in 1783 Arkwright built the first steam-driven cotton mill in Miller's Lane (now Miller St.), but whether this building was an earlier mill or simply a warehouse adjacent to the office the records do not appear to show. It is worthy of note, however, that this relic of the beginning of the factory system—indeed, of the cotton trade itself—should have stood for 130 years almost within a stone's throw of the Royal Exchange, buried and forgotten.

AN ARKWRIGHT RELIC

Architecturally the design is particularly well-balanced. The generous little clock gable and the well-proportioned windows, some still containing what are probably the original "bull's-eye" panes of glass, form a compact and satisfying whole when compared with the dreary walls and unpretentious later buildings with which it is surrounded.—The Manchester Guardian.

The exports of woolen goods from India consist almost entirely of carpets and rugs, of which about three-fourths go to the United Kingdom, and the greater part of the remainder to the United States.

Personals

Henry F. Mansfield, general superintendent of the Utica Steam & Mohawk Valley Cotton Mill, Utica, N. Y., has resigned his position after thirty years of service. He will continue on the board of directors of the company. Mr. Mansfield came to Utica from the Pacific Mill at Lawrence, in 1883. Upon the retirement of George Wiley in 1893, Mr. Mansfield was appointed superintendent.

Philip Hortenstein, for the past eleven years overseer of spinning at the Acushnet Mill Corporation, New Bedford, Mass., has severed his connection with that company.

William G. Abbott, overseer of carding at the Mount Vernon Woodberry Duck Mill, Baltimore, Md., for the past thirty years, has severed his connection with that company.

Joseph Flynn has been appointed overseer of carding at the H. T. Murdock & Co., Proctorsville, Vt., to succeed Peter Touchett.

J. W. Sands has accepted the position of overseer of finishing on the night shift for the Pontoosuc Woolen Manufacturing Co., Pittsfield, Mass. He was formerly employed at the Oakland Manufacturing Co, Sykesville, Md.

R M. Wheaton has been appointed superintendent of the Milwaukee Hammock Co., Milwaukee, Wis He was formerly employed at the Chicago Hammock Co., Chicago, Ill.

Henry Hamill, overseer of carding at the Jefferson Manufacturing Co., Jefferson, Mass., has severed his connection with that company to succeed Nicholas Hanley, who was formerly employed at the Uxbridge Worsted Co., Uxbridge, Mass.

E. H. Hills, for a number of years employed as an overseer at the Ipswich Mills Corporation, has been appointed superintendent of their branch mill at Gloucester, Mass.

W. J. Oates has accepted the position of overseer of carding at the Richmond Mills, Rossville, Ga.

Marvin Sanford has accepted the position of overseer of carding at the Midway Mills, Rockingham, N. C. He was formerly employed as overseer of spinning at the Hannah Pickett Mills, same place.

Fred A. Cumnock has been promoted from superintendent to president and manager of the Humboldt Cotton Mills, Humboldt, Tenn.

W. C. White has been promoted to the position of overseer of spinning at the Holt-Williamson Mills, Fayetteville, N. C.

H. J. Creitz has accepted the position of overseer of spinning at the Brookford Mills, Hickory, N. C. He was formerly employed at the Imperial Mills, Belmont, N. C.

J. L. Hope, formerly superintendent of the Delburg Mills, Davidson, N. C., has accepted the position of overseer of the No. 2 and 3 carding and spinning departments at the Holt-Granite Manufacturing Co., Haw River, N. C.

J. W. Kaneer has been appointed superintendent of the Statesville Cotton Mills, Statesville, N. C.

W. R. Tattersall has been appointed superintendent of the Globe Manufacturing Co., Gaffney, S. C., in addition to his duties as superintendent of the Gaffney Manufacturing Co.

James J. Ray, superintendent of the Chapel Mills Manufacturing Co., Cherry Valley, Mass., for a number of years, has severed his connection with that company. Thomas A. Kane, who has been assistant superintendent for that company, has succeeded Mr. Ray in the brick city department and Frederick Smith has been appointed superintendent of the lower mill.

Frank Sweeney has been appointed second hand in the finishing department at the Holden Leonard Co., Bennington, Vt. He was formerly employed at the Peace Dale Manufacturing Co., Peace Dale, R. I.

John P. Duane has accepted the position of night overseer of carding at the Indian Spring Mill, Madison, Me. He was formerly employed at the Darling Woolen Co., Holliston, Mass.

C. Edward Crockett, formerly overseer of weaving at the Salmon Falls Manufacturing Co., Salmon Falls, N. H., but more recently with the Newmarket Manufacturing Co., has resigned his position to accept one as overseer of weaving at the Boott Co., Lowell, Mass.

William J. Crofts has accepted the position of second hand in the carding department at the Assawaga Co., Dayville, Conn. He was formerly employed at the Auburn Woolen Co., Auburn, N. Y.

P. W. McMahon has accepted the position of assistant superintendent and designer at the Lymanville Co., Lymanville, R. I. He was formerly employed at the R. I. Worsted Co., Stafford Springs, Conn.

John L. Wagner has accepted the position of overseer of weaving at the Musketaquid Mill, U. S. Worsted Co., Lowell, Mass. He previously held a position as night overseer at this mill.

Samuel Robidoux has accepted the position of overseer of spinning at the Jefferson Manufacturing Co., Jefferson, Mass. He comes from Pawtucket, R. I.

J. F. Bresett has accepted the position of overseer of dyeing at the J. A. Humphrey & Sons Mill, Moncton, N. B., Canada. He comes from East Tampton, Conn.

Horace S. Allingham has accepted the position

of master mechanic at the Charles A. Stevens & Co., Ware, Mass. He comes from East Pepperell, Mass.

Desire Thiebault has accepted the position of overseer of weaving at the Uxbridge Worsted Co. in their Rivulet Mill department, Uxbridge, Mass.

Harry Spurr, overseer of drawing, spinning, twisting and spooling at the Star Worsted Co., Fitchburg, Mass., has severed his connection with that company.

Stephen Bowen, president of the Dundee Mills, Hooksett, N. H., has resigned on account of poor health. He is succeeded by H. Burnham. John Kimball, assistant under Mr. Bowen, has resigned his position.

P. L. Schutt, overseer of burling and mending at the Arden Mill, American Woolen Co., Fitchburg, Mass., has severed his connection with that company.

Clarence Jackson has accepted the position of overseer of finishing at the Crawford Woolen Co., Martinsburg, West Virginia. He was formerly employed at the Oakland Manufacturing Co., Reisterstown, Md.

James H. Walsh, overseer of finishing at the Tremont Worsted Co., Methuen, Mass., has severed his connection with that company.

James F. Buckley, overseer of weaving at the Franklin Mills Corporation, Unionville, Mass., has resigned to accept a similar position in one of the mills in Woonsocket, R. I.

C. N. Bagley has been appointed superintendent of the Bellingham Woolen Co., North Bellingham, Mass. He was formerly employed at the Jefferson Manufacturing Co., Jefferson, Mass.

F. G. Parker has been appointed superintendent of the Sterling Cotton Mills Co., Franklinton, N. C. He formerly held a similar position with the Fidelity Mill, Charlotte, N. C.

W. F. Howard has accepted the position of overseer of weaving at the Glenn-Lowry Mills, Whitmire, S. C. He comes from Greenwood, S. C.

F. Hall has accepted the position of overseer of weaving at the Cannon Mills No. 2, Kannapolis, N. C.

C. M. Shelton has accepted the position of overseer of spinning at the Franklin Mills, Greer, S. C.

J. P. Florence has accepted the position of overseer of carding and spinning at the Edwards Mills, Crawford, Ga. He comes from Atlanta, Ga.

W. J. Weeks has accepted the position as overseer of weaving at the Woodruff Mills, Woodruff, S. C.

James A. Greer has accepted the position of overseer of carding and spinning at the Kincaid Mill, Griffin, Ga. He was formerly employed at the Fulton Bag & Cotton Mills, Atlanta, Ga.

W. I. Willett has accepted the position of overseer of carding and spinning at the new Cannon Mill No. 2, Kannapolis, N. C.

F. J. Johnson has accepted the position of night overseer of carding at the Manetta Mills, Lando, S. C.

W. G. Mehaffey has accepted the position of overseer of carding at the Manetta Mills, Lando, S. C. He was formerly employed at the Hermitage Mill, Camden, S. C.

E. N. Tart has accepted the position of overseer of carding at the Lumberton Cotton Mills, Lumberton, N. C. He comes from Kinston, N. C.

J. E. Carter has accepted the position of overseer of weaving at the Holt-Granite Manufacturing Co., Haw River, N. C.

R. K. McCuen has been appointed superintendent of the Panola Mill, Greenwood, S. C. He formerly held a similar position with the Tyger Mill, Fairmont, S. C.

Gorham N. Norton, for many years connected with the local plants of the American Woolen Company as superintendent, has been appointed superintendent of the Chelsea Fibre Mills, Brooklyn, N. Y.

Howard I. Smith, for the past nine years overseer in the spinning department at the King Philip Mills, Fall River, Mass., has been appointed overseer of the spinning, spooling and warping departments at the Manville Mill, Manville Co., Manville, R. I. He succeeds John T Holt.

Frank L. Backus, superintendent of the Max Pollock Thread Co., Willimantic, Conn., has tendered his resignation to take effect May 1. He has held this position with this company for the past twelve years.

Frank Ricker, overseer of carding at the Tilton Mills, Tilton, N. H., has resigned to accept a similar position with Fairbanks & Dorr, Granite State Mills, Guild, N. H.

Leonard Townson, formerly piece goods dyer at the Rutholt Dye Works, Philadelphia, Pa., has accepted the position of overseer of dyeing at the Bay State Mills, American Woolen Co., Lowell, Mass.

Lewis M Smith, for the past nineteen years agent and superintendent of the American Yarn Co., Pawtucket, R. I., has tendered his resignation.

Thomas F. Carey, overseer of spinning in Mills 1 and 2 of the Pepperell Manufacturing Co., Biddeford, Me., has severed his connection with that company. He was presented with a purse of gold by his fellow employes on concluding his duties with that company.

Charles Fenton, general manager of the Windham Silk Co., Willimantic, Conn., has severed his connection with that company.

James P. Ryan has accepted the position of overseer of finishing at the Huntington Manufacturing Co., Huntington, Mass., succeeding Edward C. Russell.

Frank S. Bowen has been appointed agent of the Appleton Co., Lowell, Mass.

H. B. McKee has accepted the position of overseer of finishing at the Oakland Manufacturing Co., Sykesville, Md. He was formerly employed at the Crawford Woolen Co., Martinsburg, West Virginia.

Robert Bodycott has accepted a position with Charles W. Briggs of Norwich, Conn., to take charge of the new plant he is starting on Shaker sweaters. He comes from Brockton, Mass.

Odeton Plante has accepted the position of overseer of weaving at the Reliance Worsted Co., Norwich, Conn., succeeding Edward Heine.

Edward C. Russell, overseer of finishing at the Huntington Manufacturing Co., Huntington, Mass., has severed his connection with that company.

Carl M. Klebart has accepted the position of overseer of weaving at the Stanley Woolen Co., Uxbridge, Mass. He was formerly employed at the Lewisburg Woolen Co., Lewisburg, Pa.

Edwin Davenport has accepted the position of overseer of dyeing at the Webster Woolen Co., Sabattus, Me., succeeding the late William Bain. Mr. Davenport comes from Franklin, Mass.

George P. Kean has accepted the position of overseer of carding at the Baltic Mills Co., Baltic, Conn., succeeding Albert Collins, who has been employed at this mill for a number of years.

Lewis Irons, overseer of weaving at the Stanley Woolen Co., Uxbridge, Mass., has severed his connection with that company.

T. H. Conley, superintendent of the No. 2 Mill of the New York Mills, New York Mills, N. Y., has severed his connection with that company.

F. W. Birkenshaw, overseer of finishing at the Taconic Mill, Pittsfield, Mass., who has been at Mt. Clemens, Mich., being treated there for sciatic rheumatism, has resumed his duties as finisher at the Taconic Mill, after an absence of several weeks. His many friends will be pleased to learn of his complete recovery.

Matthew Holloran has accepted the position of overseer of carding with Henry Klous, Inc., Lawrence, Mass. He comes from Wales, Mass.

A. R. Miller has accepted the position of overseer of carding and spinning on the night shift at the Barringer Manufacturing Co., Rockwell, N. C. He was formerly employed at the Dixie Mills, Mooresville, N. C.

G. R. Kindrick has accepted the position of overseer of carding and spinning at the York Mills, Yorkville, S. C. He was formerly employed at the Patterson Manufacturing Co., Mill No. 1, China Grove, N. C.

J. R. Goodman has accepted the position of overseer of the finishing room at the Cannon Mills, Concord, N. C., succeeding R. L. Coley.

J. B. Knight has accepted the position of overseer of twisting, warping and spooling at the Aldora Mills, Barnesville, Ga. He comes from Crawford, Ga.

W. P. Lovitt has accepted the position of overseer of spinning at the Aldora Mill, Barnesville, Ga., succeeding J. H. Wilson. He comes from Orangeburg, S. C.

James Westmoreland has accepted the position of overseer of weaving at the German American Mill, Draper, N. C. He was formerly employed at the Jackson Mills, Iva, S. C.

James McDowell, who has had charge of the Richardson, Foster Co., Central Falls, R. I., has been appointed overseer of dyeing at the Lymansville Co., Lymansville, R. I., succeeding Edward Magner.

F. J. Schleicher, superintendent and manager of the Catasauqua Silk Co., Catasauqua, Pa., has severed his connection with that company.

W. H. Davis has been appointed superintendent of the Columbia Ribbon Co., Paterson, N. J. He formerly held a position as superintendent for the Hoboken Ribbon Co.

John M. Shearer, formerly master mechanic at the U. S. Worsted Co., Lawrence, Mass., who resigned his position there some time ago, has been appointed superintendent of the Merrimack Iron Foundry Co., of that city.

Robert E. Pring, overseer of the weaving department at the Hoosac Cotton Co., North Adams, Mass., for the past ten years, has resigned on account of ill health.

Fred Zoller, a foreman at the Rex Knitting Mill, Little Falls, N. Y., has severed his connection with that company to accept a position with the Singer Machine Co., Utica, N. Y.

Thomas H. Warren, overseer of carding and spinning at the Monarch Knitting Co., Dunnville, Ont., Canada, has resigned to accept a similar position at Toronto, Ont.

Theodore Wood, overseer of carding at the Dartmouth Mill, New Bedford, Mass., has been appointed agent of the American Yarn Manufacturing Co., Pawtucket, R. I., and will take up his new duties there about May 1.

John H. Binns, superintendent of the dyeing and finishing departments at the Arlington Mills, Lawrence, Mass., has severed his connection with that company, having been in their employ for the past thirteen years.

Stanley J. Wrubel has accepted the position of overseer of carding, combing and drawing at the Ettrick Mill, Worcester, Mass.

W. W. Wilson has accepted the position of overseer of spinning and twisting at the Fountain Mills, Tarboro, N. C. He was formerly employed at the Edenton Cotton Mills, Edenton, N. C.

Thomas A. Blume has accepted the position of overseer of carding and spinning at the Patterson Manufacturing Co., Mill No. 1, China Grove, N. C. He comes from Rockwell, N. C.

Charles E. Hobson has accepted the position of overseer of spinning at the Columbus Manufacturing Co., Columbus, Ga.

Thomas M. Dorgan has accepted the position of overseer of spinning at the American Felt Company, Hyde Park, Mass. He comes from East Rochester, N. H.

W. Z. McCue has been appointed superintendent of the Gluck Mills, Anderson, S. C.

J. M. Waddleton has accepted the position of overseer of the No. 1 weave room at the Barker Cotton Mill, Mobile, Ala. He comes from Spray, N. C.

C. E. Davis has been appointed superintendent of the Payne Mill, Macon, Ga.

J. A. Byrd has accepted the position of overseer of spinning and twisting at the Edenton Cotton Mills, Edenton, N. C. He comes from Kinston, N. C.

W. F. Smith has accepted the position of superintendent of the cotton department at the Atlanta Woolen Mills, Atlanta, Ga. He was formerly employed at the Payne Mill, Macon, Ga.

W. R. Cook has accepted the position of overseer of weaving, warping, slashing, drawing-in and cloth room at the Montala Manufacturing Co., Montgomery, Ala.

F. J. Ward has accepted the position of overseer of carding and spinning at the National Knitting Co., Milwaukee, Wis. He was formerly employed at the Skenandoa Cotton Co., Utica, N. Y.

Harold Dwelle has been appointed secretary of the new Erlanger Mill, Lexington, N. C. He was formerly employed at the Chadwick-Hoskins Mill, Charlotte, N. C.

George G. Boone has accepted the position of overseer of weaving at the Osage Mills, Bessemer City, N. C.

J. L. Kerley has accepted the position of overseer of carding at the Osage Mills, Messemer City, N. C.

Charles Lockman has accepted the position of overseer of spinning at the Osage Mills, Bessemer City, N. C.

William Johnson has accepted the position of overseer of spinning, spooling and twisting at the Dixie Mill, La Grange, Ga.

William D. Hartshorne, who has been connected with the Arlington Mills, Lawrence, Mass., for thirty-four years, and its agent for the past fourteen years, has tendered his resignation and owing to poor health has asked to be relieved from the duties of the office. The directors at their last meeting accepted his resignation and passed resolutions of appreciation of his service. It is expected that after an opportunity for rest and recovery of his health Mr. Hartshorne will continue some special work of investigation for the company. Alfred Sagar, who has been connected with the corporation for twenty-eight years, and who has been superintendent of the cotton department for the last twelve years, has been appointed agent.

DEATHS

Walter Kobbe, head of the firm of C. J. Bonnet, Kobbe & Co., the American house of Les Petits Fils de C. J. Bonnet, silk manufacturers of Paris and Lyons, France, died in his apartment at the Athorp, Broadway and 79th St., New York City, of heart disease. In the course of his business career he made more than a hundred crossings to Europe, for twenty-two years crossing regularly four times a year and stopping at Paris and Lyons. A wife and four brothers survive him.

William Bain, for a number of years overseer of the dyeing department at the Webster Woolen Co., Sabattus, Me., died at his home in Sabattus, recently, at the age of 54 years. Mr. Bain was born in Galachields, Scotland. When a young man he learned the art of dyeing, becoming an expert in that business. He then went to Paris, Ont., Canada, where he was dyer for the Penman's Ltd. About twenty-three years ago he was offered the position of boss dyer in the mill at Sabattus, and resigning his position in Paris, he came to Sabattus to take up the position which he held until the time of his death.

Oren Barron Smith, who held various positions in cotton mills until his retirement in 1889, died April 7, in Thompsonville, Conn., at the age of 85 years. He was born in Kirby, Vt., and worked in the mills in many New England cities. During the twenty years previous to his retirement he held a responsible position with the Boston Duck Company in Hopedale, Mass.

Stephen A. Jenks, one of the best known mill men in New England, died at Barrington, R. I., April 18. Mr. Jenks was a direct descendant of Joseph Jenks of Lynn, Mass., one of the first settlers of Pawtucket, R. I., who established an iron foundry there. His father was the inventor of the spinning ring which revolutionized the spinning of cotton. At the time of his death, Mr. Jenks was president of the following mills: Berkshire Manufacturing Co., North Adams, Mass.; Cornell Mill, Fall River, Mass.; Kilburn Mill, New Bedford, Mass. He was treasurer of the U. S. Cotton Co., Central Falls, R. I., and director of the Bourne, Parker, Seaconnet and Hargraves Mills of Fall River, Mass., also the Dartmouth, Bristol and Grinnell Mills of New Bedford, Mass. For a number of years he was director of the Slater Trust Co., and the Slater National Bank at Pawtucket, R. I.

Philip A. Mathewson, who for several years, previous to retirement, because of failing health, was superintendent of the King Philip Mills, Fall River, Mass., died in the Butler Hospital at Providence, R. I. He was one of the most capable men in the New England States, and the mills with which he had been connected, while in Fall River, were very successful under his direction. His father, mother and one sister survive him.

Norman Phelps, for the past thirteen years overseer of weaving at the Sheridan Woolen Mills, Ashuelot, N. H., died April 19 after a brief illness with rheumatism. His wife and four children survive him.

Mill News

Those interested in receiving early and more complete investigated information of projected new mills, enlargements, improvements, fires, facts and gossip of the trade are referred to the TEXTILE ADVANCE NEWS, issued weekly by the publishers of the TEXTILE WORLD RECORD, at $15.00 per year. Communications for this department are invited. There is no charge made for printing notices of new mills, enlargements, improvements, etc.

COTTON.

New Mills.

*Arkansas, Helena. During May the mill building for the St. Francis Cotton Mills will be completed. The yarn machinery in the old Premier Cotton Mills will be installed in the new mill and a weaving department of 104 looms will be equipped to weave osnaburgs and sheetings. The new mill will be modern in every way with electric power equipment and will give employment to 125 hands. E. C. Hornor is president, A. P. Hornor, treasurer, and J. B. West, manager and buyer.

*Canada, Quebec, Sherbrooke. A mill is to be built in Sherbrooke by the Canadian Connecticut Cotton Mills, Ltd., reported incorporated last week. Construction of buildings will be started just as early as arrangements for this work can be made and manufacturing will be started, according to present plans, on Jan. 1, 1914. At first employment is to be given to 100 hands. The new company has authorized capital stock of $1,750,000, instead of $175,000 as stated in the earlier report. H. L. Burrage is president; R. J. Caldwell, vice-president, and Tracy S. Lewis, treasurer and buyer. Mr. Lewis' address is Beacon Falls, Conn. R. J. Caldwell Company, New York City, are the selling agents. Mr. Lewis is president and treasurer, and Mr. Caldwell is vice-president, of the Connecticut Mills Company at Danielson, Conn., which manufactures automobile tire fabrics. The new company will manufacture special cotton fabrics, which probably means automobile tire fabrics, and will manufacture both the yarn and the cloth. The Connecticut Mills Company does not manufacture its own yarn. This new plant will be modern in every respect and will be run by electric power. A Canadian report states that a number of prominent Canadians are behind the new venture and that a bond issue of $350,000 will be offered shortly in Canada and in the United States.

*Georgia, Chickamauga. Work on the foundations for the cotton mill to be built here for the Crystal Springs Bleachery Company is nearly completed. The mill will be a fire proof, 3-story structure, 375 by 131 ft., of brick mill construction Twenty thousand spindles and 700 looms will be installed for manufacturing bag cloths. The company has not fully decided on the arrangements for power and is now negotiating to purchase electric power. If satisfactory arrangements are not made a new power plant will be built. The new mill will be completed about September 1 and it is estimated will cost about $500,000. D. A. Jewell is president, treasurer and buyer. J. E. Sirrine of Greenville, S. C., is the architect-engineer in charge.

*North Carolina, Salisbury. Before the end of this month the new Littmann Mills, Inc., will begin manufacturing. A building has been remodeled and 20 looms have been installed on which mosquito netting will be woven at present. Steam power will be used and the product will be piece dyed, bleached and finished. 1/30s and 1/40s cotton yarns on cones and in warps will be used The authorized capital stock of this company is $50,000, of which $12,500 has been paid in. I. Littmann is president, treasurer and buyer, and L. A. Henley is secretary and manager.

Enlargements and Improvements.

*Alabama, Selma. The improvements being made by the Selma Mfg. Company consist of replacing some of their old spinning frames by machines of later type. The mill will be exactly of the same capacity as before. This company manufactures bag goods. It is not incorporated, J. F. Ames of Cleveland, O., being the proprietor.

Georgia, Egan. Ten new wide looms have been added to the equipment of the Piedmont Cotton Mills. Cotton duck and crochet quilts are manufactured.

Georgia, Greensboro. The Mary Leila Cotton Mill has placed the contract for some new power transmission equipment.

Georgia, Hartwell. It is reported that the Hartwell Mills are completing plans for doubling the capacity of their plant. This increase was considered at the annual meeting last November and the stockholders were favorable to the project. Eight thousand spindles and two hundred looms are operated at present.

*Georgia, Sargent. Arrangements are being made by the Wahoo Mfg. Company for electric power equipment to take the place of the present steam power plant.

Georgia, Trion. Plans have been prepared for an extension to the plant of the Trion Company, the new company which succeeded the Trion Mfg. Company, and are now in the hands of contractors. J. E. Sirrine of Greenville, S. C., is the architect-engineer in charge. As noted some months ago $300,000 is to be expended in improving the plant.

Georgia, West Point. The improvements to be made by the Lanett Cotton Mills which are chiefly along the line of replacing old equipment, will cost about $70,000.

*Maryland, Baltimore. William E. Hooper & Sons Co., manufacturers of cotton duck, cotton yarns, rope, twine, etc., are changing from steam to electric power. The additions which have been under construction for the past year are now completed and double the capacity.

Massachusetts, Caryville. The Taft Woolen Company will build an addition to enlarge the carding department. When the addition is completed the machine shop will be moved into the room now used as a carding department and the carding equipment, with some new cards, will be set up in the new space.

Massachusetts, Lowell. The Tremont & Suffolk Mills will, in the next year or two, tear down two old mills and replace them with an extensive modern mill. Changes are now in progress in the power plant and modern equipment is taking the place of the old equipment.

Massachusetts, New Bedford. A large 1250 k. w. Curtis turbo-alternator is being built by the General Electric Company for the Butler Mills.

New Jersey, Millville. The Millville Mfg. Company is adding to the electric power equipment of its mills a 300 k. w. motor-generator set, 25 k. w. turbo-generator and switchboard. The apparatus will be furnished and installed by the General Electric Company.

North Carolina, Gastonia. In March it was reported that the Ozark Cotton Mills considered doubling the capacity of their plant. Plans have been made to build a 3-story mill, 100 by 75 ft., and to add 10,000 spindles.

North Carolina, Greensboro. Extensive changes and improvements will be made by the Pomona Mills, Inc. Five thousand spindles will be added, also an additional slasher. The contract has been let for several new tenement houses for operatives. Fancy dobby shirtings are manufactured.

North Carolina, Lexington. Ten electric motors ranging from 5 to 75 h. p. are being added to the equipment of the Dakota Cotton Mills, Inc.

North Carolina, Roanoke Rapids. New machinery equipment including cards, drawing frames, spinning frames, looms and nappers are being installed in the plant of the Patterson Mills Company.

North Carolina, Roanoke Rapids. An addition is being built to the napper room of the Roanoke Mills and 4 napping machines will be installed. This company is also putting in 256 new automatic looms.

Rhode Island, Lonsdale. Permits have been granted the Lonsdale Company for the building of additions to the dyeing, bleaching and finishing departments.

Rhode Island, Saylesville. The Crefeld Waste & Batting Company has received a permit to build an addition, 60 by 200 ft.

South Carolina, Pickens. The enlargement to the Pickens Mill, which was started several months ago, has been completed and equipped with 6,000 spindles and 160 looms. The enlargement built is a structure 105 by 86 ft., of brick.

*South Carolina, Rock Hill. Two hundred 40-in. automatic looms are being installed in the Arcade Cotton Mills replacing old model looms. No other improvements are contemplated.

*South Carolina, Union. Work has already been started on the foundations for the new 4-story mill to be built for the Monarch Cotton Mills. This enlargement includes the addition of 20,000 spindles and 500 looms to the equipment of the Monarch Cotton Mills.

*South Carolina, Ware Shoals. A large force of men are at work installing the equipment in the new No. 2 mill of the Ware Shoals Mfg. Company. Fifteen thousand spindles and three hundred looms are being installed.

*South Carolina, Whitney. Plans have been practically completed for the previously reported enlargement to be made by the Whitney Mfg. Company. A new mill will be built and 10,000 spindles will be added. The cost will be between $150,000 and $200,000. This concern manufactures standard sheetings on present equipment of 20,000 spindles and 650 looms.

Virginia, Danville. The Riverside & Dan River Cotton Mills, Inc., are adding to the equipment of electrical apparatus in their mills a 400 kv-a. synchronous motor, 20 h. p. motor and switchboard. The material has been ordered from the General Electric Company.

Mills Starting Up.

*Alabama, Selma. Goodin, Reid & Company of Cincinnati, the new owners of the old Estelle Cotton Mills, have organized a new company with capital stock of $150,000, which will take over and operate the plant. S. H. Goodin is president and H. H. Stewart is manager. The mill, which has been idle for about two years, will be started up shortly. As noted in a previous report extensive improvements are to be made in the property.

Connecticut, Turnerville. William H. Murphy of Norwich has purchased the machinery of the Oakdale Cordage Company and is removing it to the Hiscox Bldg., on Myers Alley, Norwich. Mr. Murphy is the proprietor of the Norwich 5 and 10 Cent Store. George McKay, who has been superintendent of the plant here, will continue in that capacity in the new location. It is expected the machinery will be running in a month making clothes lines, sash cords, and fish lines.

Georgia, Monroe. Manufacturing has been resumed by the Monroe Cotton Mills after an idleness of several weeks during which the plant was shut down to allow of extensive improvements being made.

*Mississippi, West Point. The new owners of the West Point Cotton Mills will organize a corporation to take over and operate the plant under the name of the Lorraine Cotton Mills. The authorized capital stock will be $125,000, of which $45,000 will be paid in. The property is at present undergoing extensive repairs and as soon as these are completed, which will be about June 1, the mill will be started up on cotton yarns. J. R. French and C. E. Wilkins of Statesville, N. C., recently purchased the property and will control the new company. Mr. Wilkins is the president and salesmanager and Mr. French will be treasurer, manager and buyer.

WOOLEN.

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New Mills.

Pennsylvania, Philadelphia. A portion of the mill occupied by the Hughes Mfg. Co. at Ortho dox and Horrocks Sts., Frankford, has been leased by a concern operating under the name of the Harkel Company, who have installed a number of looms on which they are manufacturing woolen and worsted fabrics.

Rhode Island, Pawtucket. A new company has been incorporated under the name of the Oswegatchie Textile Company with capital stock of $100,000, by John T. Kirk, Frederick F. Halladay, Jr., and John W. Ramsbottom. John T. Kirk has been elected president, Mr. Halliday, treasurer, and Mr. Ramsbottom, manager and buyer. An office has been established at 188 Main St., Pawtucket. The new company will manufacture baby carriage robes, shawls, towels and novelties, and will shortly decide on details of equipment.

Rhode Island, Warren. The Warren Worsted Mills has been incorporated with capital stock of $150,000 by Walter A. Guile, president and general manager, and Clarence A. Brouwer, treasurer. The new company will manufacture fine worsted goods beginning operations with 60 looms. A mill will be built near the railroad station in Warren, 60 by 300 ft., of brick construction with saw tooth roof, and construction contract has been let to the J. W. Bishop Company, who have agreed to complete the mill ready for the installation of machinery within 60 days. Electric power will be used.

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Enlargements and Improvements.

Canada, Ontario, Toronto. The Smith Mfg. Company, Ltd., wool stock and shoddy manufacturers, who recently removed into their new building at 201-5 Front St., are now operating 10 sets of cards. As noted recently the old mill formerly occupied by this concern has been taken over by the Standard Woolen Mills Company of Toronto.

*Connecticut, Bridgeport. Good progress is being made on the new building being erected for the Salt's Textile Mfg. Company. A new power house will be built in connection with this mill Estimates are now being received for the construction of the second new building which it was reported in February was contemplated. This will be a one-story brick weave shed with saw tooth roof. The plans were prepared by the Fletcher Engineering Company.

Connecticut, Rockville. A 2-story brick addition, 70 by 100 ft., is to be built to the plant of the James J. Regan Mfg. Co., Inc. The Regan Company recently took over the Saxony mill of the Hockanum Company and will operate 40 looms in this department with the necessary finishing machinery. During the next few months the carding and spinning departments of the Regan plant will be operated nights to keep this extra number of looms in operation.

*Massachusetts, Athol. Manufacturing has been resumed in the plant of the Millers River Mfg. Company after the fire which occurred about the middle of March. Before the end of the month all of the damage will be repaired and the mill will be running practically in full. It has been noted that 30 new looms, a new washer and a dryer will be installed.

Massachusetts, Clinton. Plans for an addition are being made by the Earnsdale Worsted Mills, which include the building of another story on the mill and the installation of 20 looms. A bid for the work has been received from a local contractor. Harold A. Shuman, secretary and manager, states that nothing definite has been decided upon as yet regarding any additions.

*Massachusetts, Holliston. Eight looms will be installed in the 40 ft. addition being built to the plant of the Darling Woolen Mill Company.

Massachusetts, Lowell. New chinchilla machines have been installed in the finishing department of the Bay State Mill of the American Woolen Company. The finishing department and the picker department are running overtime.

Massachusetts, Ware. The Geo. H. Gilbert Mfg. Company is arranging for operation by electric power and will equip the power station with a 1250 kv-a. Curtis turbo-alternator and 312 kv-a. alternating current generator. Throughout the mills nine motors ranging from 35 to 100 h. p. will drive machinery. All the electrical equipment has been ordered from the General Electric Company, which will also make the installation.

*Massachusetts, Webster. A new fireproof storehouse will be built by S. Slater & Sons, Inc., to replace the wool storehouse recently burned. The new building will be 120 ft. long by 80 ft. wide, 3 stories high. At the offering of 15,000 preferred and 30,000 common shares of S. Slater & Sons, Inc., comprising the entire capitalization, which has been held by the trustees, there were no bids. This marks the final step in the retention of the mill properties in the family.

Michigan, Hastings. Between $25,000 and $30,000 is to be expended by the Hastings Wool Boot Company for improvements to the factory. Felt boots are manufactured.

Pennsylvania, Honesdale. Birdsall Bros. Company, manufacturers of blankets, flannels and cassimeres, with 3 sets and 24 looms, are enlarging their plant so as to accommodate 10 additional looms. A 2-story frame addition, 21 by 40 ft., is under construction.

Pennsylvania, Philadelphia. A contract has been recently given out by C. H. Masland & Sons, manufacturers of carpets at Amber and Westmoreland Sts., for a new and large addition to their present plant. The new operation will consist of a 5-story and basement building, 65 by 100 ft., at the corner of Amber and Willard Sts., across the street from their present plant, and will cost in the neighborhood of $50,000.

Pennsylvania, Philadelphia. The Saxonia Dress Goods Mills have purchased a lot on A St. extending from Allegheny Ave. to Ontario St., from the Pennsylvania R R. A group of buildings will be erected on the land. The buildings will include a

5-story mill, 173 by 58 ft.; a weave shed, 167 by 97 ft.; a spinning mill, 127 ft. long; and a power house, 45 by 38 ft. This concern manufactures fancy dress goods and woolens on present equipment of 150 looms. The capital stock is $250,000. Joseph Kaufman is president, and Fred Eick, superintendent.

*Vermont, North Montpelier. It is reported that the Little Mfg. Company, whose plant was destroyed by fire several months ago, will rebuild on a larger scale. Fred and Walter Little will be in control of the new company. The concern will, as formerly, make a specialty of white flannels but will also manufacture colored woolen goods for children's garments. The new mill will be 150 by 54 ft. of modern construction with separate fireproof picker building. It will be completed about September 1, and equipment will be installed to give employment to about 50 hands. Before the fire 3 sets and 24 looms were operated on white flannels only.

*West Virginia, Barnesville. Arrangements have been made by the Barnesville Mfg. Company to erect the addition reported in January. The enlargement will be of brick and concrete, 100 by 65 ft. It was noted in a previous report that two sets of cards and eight looms will be added. This equipment will be driven by gas and steam power. Flannels, blankets, dress goods and skirts are manufactured by this company on present equipment of three sets, 1,880 spindles and 32 looms. J. M. Hartley is president and G. W. Mack is treasurer and manager. The post office address is Fairmont.

Wisconsin, Burlington. The Burlington Blanket Company has added a new department for the manufacture of mackinaw coats. Part of the necessary machinery has been received. The establishment of this new department will not interfere with the regular lines.

*Wisconsin, Chippewa Falls. Work on the new addition to the Chippewa Falls Woolen Mill will be started soon. The enlargement will be 4 stories high with basement, of brick construction It was noted in January that an addition would be built and equipped as a dye house and scouring room. The concern is very busy manufacturing mackinaws and mackinaw coats.

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Mills Starting Up.

Massachusetts, Methuen. Alfred C. Gaunt, until recently treasurer and buyer of the Tremont Worsted Mills, has leased the old mill formerly occupied by the Marshall Worsted Company and is installing looms and dyeing and finishing equipment. He will manufacture worsted goods and do commission dyeing and finishing under the name of the Merrimack Mills.

*Pennsylvania, Erie. The Puritan Woolen Mills Co., a corporation reported organized several weeks ago, takes over the John Tauber Woolen Mills and will begin operations in July making wool bats, wool filled comforts, and similar goods. The new company has a capital stock of $10,000. F. H. Paul is president and buyer, and D. H. Hill is treasurer.

Mills Shutting Down.

Massachusetts, Methuen. The Tremont Worsted Mills are running out stock preparatory to liquidation. At the present time all the machinery is running in full, but in about three weeks the stock will begin to run out and in about six weeks all the stock will be cleaned up. For the future there have been no definite plans formulated, although it is hoped that a company will be organized to start up the plant within a short time. The Merchants' Trust Company, which has control of the property, is understood to be negotiating with new interests who desire to take it over. S. H. Bailey, Jr., recently succeeded Alfred C. Gaunt as manager and Mr. Gaunt is starting up on his own account in the building formerly occupied by the Marshall Worsted Co., as noted in another part of this issue.

Michigan, Detroit. The Armstrong Woolen Co., operating 16 looms on worsted dress goods which they dyed and finished and sold direct, have disposed of almost their entire equipment to Armshire & Wheeler, second hand machinery dealers at 2411 N. 2nd St., Philadelphia, who will remove it to that city with a view of disposing of it to other parties. The buildings have been sold, it is said, to a company engaged in the manufacture of automobiles.

Pennsylvania, Philadelphia. The Crefeld Worsted Mills, operated by William Secor, at Church St. and Adams Ave., Frankford, containing 12 broad looms on which he manufactured worsted men's wear, has gone out of business. The equipment of the plant has been disposed of to other parties.

KNIT.

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New Mills.

*Connecticut, Norwich. The new knitting plant being established here at 95 Chestnut St. by Charles W. Briggs will begin operations on medium and high grade sweater coats. It is too early to give a detailed report. The business is owned by Mr. Briggs but later on may be incorporated. Mr. Briggs personally attends to the buying. Robert Bodycott, formerly of Brockton, Mass., is superintendent. Operations will be started in a few days with 10 hands.

New York, Waterford. L. A. O'Lena will establish a knitting plant in Waterford to make all kinds of knitted novelties. Mr. O'Lena was until recently connected with the Electric Knitting Company of Cohoes, but has disposed of his interest in that concern as noted a few weeks ago.

*North Carolina, Burlington. The new Southern Hosiery Mills, recently organized by L. C. Christman and C. J. Boland, have secured the Christman Bldg. on Spring St., a 2-story brick building, 60 by 30 ft., and will begin operations about May 1 making ladies' fine gauge hosiery from 36s, 40s and 80s yarns. The equipment will consist of 60 knitting machines and 3 sewing machines driven by electric power. The capital stock of the new company is $10,000. L. C. Christman is president and treasurer and C. J.

Boland is manager and buyer. Mr. Christman is vice-president of the Whitehead Hosiery Mills of Burlington which it was noted recently is about to expend $75,000 on a new plant.

*North Carolina, Chapel Hill. A plant has been partially equipped for the Blanche Hosiery Mills Company, reported incorporated in March with authorized capital stock of $100,000. It is understood that $15,000 has been paid in. W. S. Robertson is president; Blanche G. Lindsey, vice-president, and W. E. Lindsey, secretary and treasurer.

*North Carolina, China Grove. The Lillian Knitting Mills Company of Albemarle has decided to locate the proposed branch mill at China Grove. A site near the Patterson Mills has been secured and building contracts will be awarded as early as possible for a brick mill 125 ft. long by 50 ft. wide, with separate boiler and engine room. One hundred knitting machines and electric power equipment will be installed and employment will be given to about 150 hands. They expect the new mill will be running by July 1. The Lillian Knitting Mills Company manufacture women's seamless cotton hosiery and infants' hosiery with 180 latch needle knitting machines, also dyeing and bleaching. J. S. Efird is president, and A. L. Patterson is treasurer and buyer. A 3-story addition was recently built on the main mill at Albemarle.

North Carolina, Wendell. A mill for the new Wendell Knitting Mills Company is being built. At first 50 knitting machines will be installed, and later increased to 100 knitting machines. The mill is a brick structure, 96 by 32 ft., which will cost from $7,000 to $8,000. This company was incorporated last December with authorized capital stock of $100,000, of which $20,000 is paid in. R. B. Whitley, the owner of the Whitley Mfg. Company of this place which manufactures cotton hosiery yarns, heads the new concern and is the president.

Pennsylvania, Cambridge Springs. A company is being formed under the name of the Cambridge Springs Knitting Company and will be incorporated under the laws of Pennsylvania with capital stock of $20,000. The new company is financed and controlled by local capital and the officers will be G. L. Wade, president; C. W. Jones, vice-president; J. A. Bolard, secretary, and N. H. Bertram, treasurer. George Cooper, who comes from Cleveland, O., and is a successful foreman will have charge of the knitting department. It is the purpose of the company to confine its output exclusively to a high grade of ladies' knit underwear.

Pennsylvania, Elverson. A branch mill is being established here by the Maiden Creek Hosiery Company of Temple, Pa., and will be equipped with 60 new knitting machines for making men's fine gauge seamless hosiery. Operations will be started about May 1. The starting of this mill does not affect the operation of the main plant at Temple or the branch plant at Blandon. The buying for the mills is done by C. L. Seidel, who is located at Temple.

*Pennsylvania, Harrisburg. The new Modern Textile Company, reported incorporated last week with capital stock of $10,000 by J. C. Ewing and associates, is occupyng the second floor of the building at Sixteenth and Elm Sts. Operations will be started in a few days making children's and misses' two-piece underwear. The equipment will consist of four knitting machines and ten sewing machines operated by electric power. J. H. Gingrich is president; J. F. Heisley, treasurer; J. C. Ewing, manager and buyer; and C. B. Taylor, superintendent.

*Pennsylvania, Lehighton. In a previous report it was stated that I. Zimmerman was equipping a plant on N. 6th St. with 6 knitters and 4 sewing machines for manufacturing ladies' shaped vests. The new plant is owned by Zimmerman & Altemose and will begin manufacturing about April 15, with E. Braithwaite as superintendent and buyer. Electric power will be used.

Pennsylvania, New Cumberland. A. R. Kreider & Bro., hosiery manufacturers of Annville, will establish a branch plant at New Cumberland. A building on Water St. formerly used as a dye and bleach works is being repaired for this purpose. A. R. Kreider & Bro. manufacture men's and women's seamless hosiery in light and medium weights. They also have a branch at Lebanon.

Pennsylvania, Philadelphia. It is reported that C. C. Silverwood, in conjunction with other parties, has recently purchased an equipment for a plant to manufacture seamless hosiery, the machinery being installed at 4224 Germantown Ave.

*Pennsylvania, Pottsville. The small knit underwear plant recently equipped by Jacob Boltz has begun manufacturing with 6 knitters and 4 sewing machines making women's extra size underwear. Electric power is used. The plant is located at 317 N. 9th St.

Rhode Island, Warren. A new company has been incorporated to manufacture knit goods under the name of the Swiss Textile Company with capital stock of $25,000. The incorporators are Charles A. Gonzenbach, George Barker and Louis Gonzenbach, all of Warren. The plant is to be established in Warren.

*Tennessee, Lawrenceburg. The branch plant established here in temporary quarters by the May Hosiery Mills of Nashville have proved a success and a new hosiery mill is to be built at once. A site is being furnished and the mill built by the citizens and will be deeded to the May Hosiery Mills when they have paid $40,000 in wages. The mill will be 60 by 168 ft., of brick construction and will be ready for occupancy by July 1. It will be equipped with 75 knitters.

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Enlargements and Improvements.

*California, San Francisco. The foundation is now being laid for the new factory building to be erected by the Gantner & Mattern Company. Particulars of this new mill have been given previously. It will be five stories with basement, of reinforced concrete construction, and have nearly 16,000 square feet of manufacturing space on each floor. They expect to have the building ready for occupancy on or about September 1.

The present mill will be discontinued as the new mill will give 100 per cent. greater capacity. The same lines of goods made now will be manufactured.

Georgia, Barnesville. Contract has been awarded by the Collier Mfg. Company for the enlargement recently noted. The addition will be 2 stories, 100 by 50 ft., of brick. It will be equipped with 90 knitting machines to manufacture light weight two-piece underwear. B. C. Collier is secretary and treasurer.

Maryland, Frostburg. The Parker Hosiery Mill & Dye Works of Portsmouth, Va., are well satisfied with manufacturing conditions at Frostburg and 10 additional hosiery machines will probably be installed in the local plant. Eighty-six machines are now operated here.

Massachusetts, Florence. The Northampton Silk Company is laying the foundation for a dyehouse. It is understood this new department is being established as a result of the strike in Paterson, N. J., the company having decided to do its own dyeing hereafter owing to the inconvenience caused by the trouble in Paterson.

Massachusetts, Lowell. The Lawrence Mfg. Company will erect a new storehouse to be known as No. 11, at an estimated cost of $7,500.

Michigan, Grand Rapids. Plans are being made by the Globe Knitting Works for adding a story on the old plant which will make it 6 stories high. About two years ago an addition was built, 80 by 100 ft., 6 stories high, and this addition to the old plant will make it uniform with the annex. The old plant is 130 by 100 ft. Men's, women's and children's ribbed underwear and union suits are manufactured. E. H. Clements is president and buyer.

New Jersey, Vineland. Report has it that the Vineland Glove and Hosiery Mill, who recently installed a number of knitters on which they are manufacturing men's and women's seamless hosiery, will at a later date put in a department for the dyeing and finishing of their own goods.

New York, Brooklyn. The Fashion Knitting Works at 206 Manhattan Ave., which has been operating on hand knit goods, is arranging for the installation of a number of machines on which they propose manufacturing high grade sweater coats.

New York, Camden. A new boiler house, 30 by 22 ft., will be built at the local plant of the Frisbie & Stansfield Knitting Company to provide space for a new 150 h. p. boiler which has been ordered. George W. Shippey of Utica has the construction contract and will begin work on the building at once.

New York, Ilion. The Sterling Mills, manufacturers of sweater coats, making their own woolen and merino yarns, have built an addition and added another set of cards, mule and cone winders Additional knitting and finishing machines also have been installed.

New York, Little Falls. The Little Falls Mfg. Company, manufacturers of ladies' ribbed cotton underwear, recently installed a Hoff-Man underwear press.

New York, New York City. Glickman-Miller & Company, manufacturers of knitted silk ties at 114 East 28th St., will move on May 1 to some other location not yet decided upon. The equipment is to be increased.

*North Carolina, Burlington. Within a short time work will be started on the 3-story mill, 160 by 50 ft., for the Whitehead Hosiery Mills, Inc. The first floor will contain the offices, storage and shipping rooms and the other two floors will be equipped for hosiery manufacturing. The present quarters will be discontinued on the completion of the new mill about August 15 and the equipment will be increased to 200 knitters, 45 ribbers, and 35 loopers. The enlargement represents a cost of $75,000 and the capital stock will be increased from $25,000 to $100,000. R. H. Whitehead is treasurer and buyer.

North Carolina, Winston-Salem. A new boiler has been ordered by the P. H. Hanes Knitting Company.

Ohio, Cleveland. The Fashion Knitting Company, manufacturers of sweater coats and fancy knit goods, have increased to 15 knitting machines and 18 sewing machines and will make a further increase. The capital stock was recently increased from $10,000 to $50,000. H. H. Weedon is now president and treasurer, and M. H. Shufelt is superintendent. E. S. Couzens continues as buyer. The plant is located at 1265 W. 2d St.

*Ohio, Portsmouth. The Mitchell Mfg. Company has succeeded the Scott Knitting Company and is manufacturing in the knitting department a medium grade of men's union suits with patent closed crotch on 20 knitting and 75 sewing machines.

*Ohio, Toledo. The Dolphin Hosiery Company, which recently removed to larger quarters as noted, has increased its equipment from 25 knitters to 60 knitters. Men's half hose in cotton, mercerized and silk is manufactured.

*Pennsylvania, Lykens. The hosiery knitting plant of the Estate of John R. Fisher, which was destroyed by fire some months ago, will be rebuilt. They are now occupying temporary quarters. Men's and women's seamless hosiery and half hose in silk and cotton from 176 to 240-needle goods are manufactured.

Pennsylvania, Philadelphia. The Federal Knitting Co., who have been manufacturing a line of high grade silk knitted neckwear on an equipment of full fashioned frames at 10th and Diamond Sts., have recently placed an order for a number of seamless necktie machines, which they will operate on a line of seamless goods as well as their other lines.

Pennsylvania, Philadelphia. The Reliance Hosiery Co., 4947 Wakefield St., manufacturers of men's and women's seamless cotton hosiery, who are now occupying a portion of a 3-story building, report that within a short time it is their intention to take over the entire building and install additional machinery for the purpose of increasing their output.

*Pennsylvania, Pittston. When equipped, the addition to the Alpine Knitting Mills now under construction, will increase the daily output to 500 dozens of underwear. The Alpine Knitting Mills are now owned and operated by John H. Foy and his son, Frank M. Foy. Frank M. Foy is the manager and buyer. The addition is a 1-story structure, 70 by 58 ft. Work was started April 1.

Pennsylvania, Reading. Kuersten & Rick, manufacturers of cotton hosiery, are making some repairs and improvements.

Pennsylvania, Reading. Albert Weber, manufacturer of men's and infants' hosiery, is making some improvements in his plant, including the installation of a fire sprinkler service.

*Pennsylvania, Reading. The burned plant of the Oakbrook Hosiery Company is being rebuilt on a larger scale. The new mill will be of brick construction and will cover twice the area of the old building. Manufacturing will be resumed in June. Women's seamless cotton hosiery is the product of this concern.

*Pennsylvania, Reading. The Reading Glove & Mitten Mfg. Company are moving into their new mill at Gordon and Buttonwood Sts. There is considerable room for increases in equipment in the new plant.

*Rhode Island, Pawtucket. Ground has been broken for the new addition to be erected at the plant of the Lumb Knitting Company. The building will be 100 by 100 ft., to correspond in general design with the present mill. Another improvement is the building of a power plant. These enlargements will be completed by October 1.

*Tennessee, Knoxville. The Knoxville Knitting Mills Company will rebuilt at once the bleach house which was recently destroyed by fire. This department is separate from the main mill buildings which were not damaged in any way. The new bleach house will be considerably larger than the old one and will be equipped with a complete sprinkler system, as all the main buildings are equipped.

Vermont, Bennington. The Cooper Mfg. Company have added another Hoff-Man press to their equipment. Men's and women's ribbed underwear in cotton, woolen, worsted and merino is manufactured.

Wisconsin, Green Bay. The Inland Knitting Works have purchased the machinery formerly operated by the Imperial Knitting Mill at Appleton, Wis.

*Wisconsin, Merrill. Ground was broken a few days ago for the foundation of the Merrill Knitting Company's new plant, details of which were given recently. The company wishes to have its new plant completed by June 1 and the contractors, Hesterman & Torkelson, will rush the work as rapidly as possible. The capital stock was recently increased to $30,000.

Mills Starting Up.

*Massachusetts, Gloucester. The branch plant of the Ipswich Mills of Ipswich, has begun manufacturing with 20 hands. Additional machinery is being installed and if the operatives can be secured, 100 knitting machines will be operated here.

New York, Oswego. Daniel H. Conway, formerly associated with the Conway Brewing Company of Troy, and James Shufelt will operate the mill which Mr. Shufelt built about two years ago at the corner of E. Third and Lawrence Sts. which was designed for a knit underwear plant. It is stated operations will be started in about two weeks. A charter will be secured under the laws of New York. Several months ago arrangements were made by Mr. Shufelt with W. H. Spanswick, of the W. H. Spanswick Mfg. Company of Fulton, N. Y., to start up the plant under the name of the Oswego Textile Company on children's ribbed underwear. Some hitch occurred, however, and the mill never was started although samples were gotten out.

Pennsylvania, Philadelphia. W. F. Taft & Co., Coral and Adams Sts., whose plant containing 24 knitting frames operated on eiderdowns, etc., has been shut down for some time back, have resumed manufacturing, making astrakans.

Pennsylvania, Philadelphia. It is reported that A. K. Clemmer, who two or three years ago operated a plant at Birdsboro, on seamless hosiery, which he subsequently removed to Hatfield and then shut down for several months, has again started up in the latter town.

*Pennsylvania, Virginsville. The branch plant established here by Charles A. Wanner, a hosiery manufacturer of Fleetwood, has begun operations.

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Mills Shutting Down.

Pennsylvania, Philadelphia. James Matlack, who recently started up a plant at 2420 Waterloo St., installing a number of looping machines for the purpose of looping for the trade, has disposed of his equipment and retired from business.

SILK.

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New Mills.

New York, College Point. A new mill is being built here by the Atlas Silk Company, 533 West 54th St., New York, manufacturers of silk ribbons on 75 looms. The business will be moved from New York to the new mill during the summer.

*Pennsylvania, Bangor. A location on High St. has been secured by the new H. F. Raub Silk Company, Inc., and manufacturing will begin during August with equipment including four knitting machines, making silk gloves, undervests, hosiery and jersey cloths. Electric power will be used. This company was incorporated recently with capital stock of $20,000. Dr. R. S. Raub of Easton is president; and H. F. Raub is treasurer, manager and buyer.

*Pennsylvania, Berwick. Plans are being prepared for the new silk mill to be established here by Fred Muster, formerly superintendent of the Baer Silk Company. The Baer Company does silk throwing and the new company will probably be a silk throwing plant.

New Publications

(Any work noticed under this head can be obtained through the office of this journal.)

The Physical, Microscopical and Chemical Properties of Textile Fibers, by J. Merritt Matthews, Ph. D.; 630 pages, 5 1/2 by 9; John Wiley & Sons, 43 E. 19th St., New York. Price $4.

The appearance of the third edition of this well known work is additional evidence of its popularity and merit. The text has been carefully revised and some additions made to the work which has become a standard hand book in the trade.

Dyeing (Die Farberei), by Dr. W. Zaenker; 233 pages, 5 1/2 by 8 1/2; Dr. Max Jaenecke, Verlagsbuchhandlung, Leipzig, Germany. Price $1.75.

The introduction of this work consists of a brief history of dyeing from ancient times to the present day. The work deals mainly with the dyeing of cotton goods and under this head is included an account of the method of cleaning cotton preparatory to dyeing, also mercerizing, bleaching and dyeing. The author treats of both the mechanical and chemical branches of the subject. The book is freely illustrated, the text being in German.

Workmen's Compensation, by James H. Boyd: 2 volumes, 1622 pages, 5 1/2 by 9; Bobbs-Merrill Co., Indianapolis, Ind. Price $9.

The enactment of workmen's compensation and industrial insurance laws in many of the States and the widespread interest in this subject in all parts of the country have created the need for this work. Beginning with a chapter on the fundamental principles underlying employers' liability laws, the author gives a historical sketch of the development of workmen's compensation and industrial insurance in the United States and a historical review of the German and British plans. The following abstract of the table of contents shows the scope of the work: 1, Distinction between the common and statute law relating to workmen's insurance and compensation; 2, Historical sketch of the development in the United States; 3, Review of the German and British plans; 4, German system of sick and accident insurance and old age pensions; 5, Economic basis of workmen's compensation laws; 6 and 7, Workmen's compensation acts of New York and Montana; 8, Analysis of the principles of compensation laws; 9, Summary of foreign compensation laws; 10 and 11, The workmen's insurance acts in Washington and Ohio; 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 and 23, The workmen's compensation act in Wisconsin, New Jersey, California, Nevada, Kansas, New Hampshire, Massachusetts, Illinois, Michigan, Rhode Island, Arizona and Maryland; 24, Federal Compensation Acts for Government employes; 25, Matters common to American statutes; 26, Workmen within meaning of statute; 27, Injuries for which compensation is allowed; 28, Whether servant was in the course of his employment when injured; 29, Dependents of deceased workmen; 30, Liability of principal contractor; 31, Amount of compensation; 32, Procedure under British act; 33, The British workmen's compensation and insurance act of 1911; 34, British industrial insurance prior to 1911; 35, German workmen's insurance code of 1911; 36, Text of German code.

Knitting (Die Wirkerei und Strickerei), by Josef Worm, Director of the Knitting School at Chemnitz; 240 pages, 5 1/2 by 8 1/2; Dr. Max Jaenecke, Verlagsbuchhandlung, Leipzig, Germany. Price $1.75.

This important addition to the literature of knitting begins with a brief account of the raw materials of the knitting industry, including an account of the various Continental methods of numbering yarn. The subject is treated in the remainder of the volume under the following heads: 2, Flat Goods; 3, Flat Knitting Machines; 4, Circular Knitting Machines; 5, Hand and Power Knitting Machines; 6, Warp Knitting; 7, Warp Knitting Machines; 8, Machines for Knitting Trimming; 9, Finishing Knit Goods. The work, which is written by the director of the knitting school at Chemnitz, is devoted mainly to German methods. The book is freely illustrated, the text being in German.

Finishing Goods Made of Vegetable Fiber (Die Ausruestung der Stoffe aus Pflanzenfasern), by Prof. F. Brenger; 121 pages, 5 1/2 by 8 1/2; Dr. Max Jaenecke, Verlagsbuchhandlung, Leipzig, Germany. Price $1.25.

This is a condensed account of the processes and machinery employed in the manufacture of cotton, linen and jute fabrics, the following abstract of the table of contents showing the manner in which the subject is treated: 1, Scouring and Cleaning; 2, Finishing Processes; 3, Accessory Operations; 4, Measuring and Packing. The book is freely illustrated and deals mainly with German processes, the text being in German.

Waterproofing Fabrics (Les Tissus Impermeables), by D. de Prat; 144 pages, 5 1/2 by 9; Ch. Beranger, 15 Rue des Saints-Peres, Paris, France. Price $1.75.

This book has been written to supply the need of an up to date work on the waterproofing of textile goods. Merzinski's excellent work on the waterproofing of fabrics, which has been published in both German and English, has now been before the trade for more than 10 years, during which time the only literature dealing with the developments in waterproofing have been scattered articles in technical journals. This development is especially marked in the manufacture of waterproof fabrics for balloons and aeroplanes, owing to the improvement in these appliances for navigating the air. The subject is treated in the present work under the following heads: Tests for fabrics; preparation of the goods; methods of waterproofing, waterproofing with rubber, waterproofing with metallic

salts, waterproofing with paraffine, gelatine, etc., various methods; testing of waterproofed fabrics; awnings and tarpaulin, wax fabrics and mole skins, aeroplane fabrics, balloon fabrics, tests of gas-proof fabrics; varieties of goods used for balloons. The text is in French.

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Dyestuff Tables (Farbstofftabellem), by Gustav Schultz; 280 pages, 7 1/2 by 10 1/2; Weidmannsche Buchhandlung, Berlin, Germany.

This is the 5th edition of a work which gives in tabular form the commercial name, chemical constitution and properties of the various artificial dyestuffs on the market. There is also a column containing references to the literature on each dyestuff. The work has been very favorably received in Germany, the text being in German.

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BUSINESS LITERATURE

Singer Sewing Machines in the Manufacture of Knit Underwear; Singer Sewing Machine Co., Singer Bldg., New York.

A 57-page booklet describing and illustrating the various machines built by this company for the manufacture of knit underwear. They include machines for seaming, seam covering, overedge seaming, welting, necking, bindings, staying and facing, finishing, buttonholes, button sewing, labeling, drawer finishing, drawer banding, edging, strapping, reinforcing drawer seats, eyeletting, gusset and sleeve tacking, ornamenting, pillar bar lace, lace and beading and a sample of the work done by each machine is shown. A copy of the booklet can be had on application.

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Graphite for the Boiler; Joseph Dixon Crucible Co., Jersey City, N. J.

This is a booklet giving much useful information regarding the use of Dixon graphite for removing scale from boilers. This product has been used successfully for many years. Boiler users who are not familiar with its merits should send for a copy.

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The Scaife Gasoline Storage Outfits; Wm. B. Scaife & Sons Co., Pittsburgh, Pa.

An 8-page pamphlet describing and illustrating the Scaife gasoline storage outfits, gasoline tanks, garage tanks, pumps, etc. These outfits and tanks are suitable not only for gasoline, but for oils and other liquids.

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How to Make Your Canvas Belts do Best Work; Cling Surface Co., Buffalo, N. Y.

This 12-page booklet contains an illustrated account of the various applications of Cling-Surface to canvas belts. It also gives much valuable information regarding the care and use of belts. A copy will be mailed on application.

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The Fog Horn; The G. M. Parks Co., Fitchburg, Mass.

After a silence of nearly a year the trade was aroused in April by a blast of the "Fog Horn," edited and published by the G. M. Parks Co. The April "Fog Horn" serves the double purpose of delivering a year's accumulation of wit, humor and useful information about humidifying, and also of celebrating the fifth anniversary of the first noise made by the "Fog Horn" in the humidifying line. Beginning with an editorial introduction the April issue contains an instructive article by Frederic W. Parks on "Air Conditioning for Textile Mills".

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Arguto Oilless Bearings; The Arguto Oilless Bearing Co., Wayne Junction, Philadelphia, Pa.

A 47-page booklet containing an illustrated description of the Arguto oilless bearings, as applied to loose pulleys, friction clutches, grinding machinery, countershaft equipment and other lines of textile machinery. One of the direct advantages derived from the use of these bearings is the saving of oil and the necessary labor attending its use. Fire risks are reduced to a minimum where Arguto bearings are used.

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Buffalo Mill Exhausters; Buffalo Forge Co., Buffalo, N. Y.

A booklet containing considerable information on the design and layout of exhaust systems for wood working shops, textile mills, cotton gins and machine shops. There is a table showing the size of pipes necessary to serve the various wood working, buffing wheels, tumbling barrels, etc. Information is also given as to the proper construction of hoods, and rules given for determining their size under varying requirements.

Industrial Notes

LOUIS HIRSCH MOVES TO LARGER QUARTERS

The increase in the business of Louis Hirsch, the well known dealer in full fashioned knitting machines, has necessitated his moving to larger quarters, his offices and sales rooms being now located at 173-177 Lafayette St., New York. Mr. Hirsch's principal line is the flat knitting machines built by Karl Lieberknecht, Oberlungwitz, Saxony. Established since 1873, Mr. Lieberknecht has continually improved the workmanship of his machines and he is now building full fashioned knitting machines with all the known improvements and suitable in every respect to American requirements. His reputation as a builder of highly satisfactory machinery is well known, and Mr. Hirsch guarantees the machines to be in every way satisfactory and up to specifications.

Mr. Lieberknecht has made a specialty of building machines for special purposes and gives personal expert attention to every order, thus ensuring the fullest satisfaction. The Lieberknecht factory is being enlarged to double its size to ensure prompt delivery and perfect execution of all orders. Mr. Hirsch also handles the warp machines of Otto Seifert, Burgstaedt, Saxony, as well as his Jacquard Raschel machines (warp machines). Mr. Seifert makes a specialty of building warp machines for all purposes such as manufacturing elastic hat bands, shawls, scarfs, veils and laces.

Mr. Hirsch is ready at all times to give his many customers and friends any information they may wish to obtain in this line of business. His extensive connections, both in this country and in Europe, enables him to secure correct and quick information on all subjects pertaining to this business.

THE AMERICAN PULLEY COMPANY'S BANQUET

The officers of the American Pulley Company were hosts at a banquet held at the Germantown Cricket Club of Philadelphia on April first. C. A. Brinley, president of the company, presided in a very delightful manner and gave out some extremely cheering intelligence regarding the employees' beneficial fund, which is now being set aside for the sole benefit of the employees. Plans were discussed looking to the greater development of the company which is one of the best conducted in America. Horace Sheble, an expert on efficiency, gave an interesting talk on methods to be pursued.

The committee in charge of the entertainment consisted of William R. Simpson and J. W. Muir.

LEGAL ENGINEERING SERVICES

F. W. Dean, Inc., 53 State St., Boston, Mass., announce that they are prepared to make examinations of mercantile and manufacturing properties for various purposes, such as appraisals, insurance values, insurance adjustments, value of power, water power capacity, etc. In legal cases relating to loss of water or water power, and the value of water for any purpose, they are prepared to give expert testimony and also assist lawyers in accident cases.

TEXTILE MANUFACTURERS' SUPPLIES

One of the old established supply houses in the middle states is George T. Frost & Son, 563 E. 23rd St., Paterson, N. J. They do a big business with the silk mills and other textile concerns in that part of the country. Their specialties are braided banding made from high-grade Egyptian and Sea Island yarns. They also carry a full line of bobbins, spools, flyers, wire goods, quills, swifts and a general line of mill supplies.

NOT AFFECTED BY THE FLOOD

The following notice has been sent to the trade:

Indianapolis, Ind.

Gentlemen: Our works were not affected in any way by the recent flood in this vicinity. We understand that exaggerated reports of damage caused by the flood to the industries of this city have appeared in the newspapers throughout the country.

There will be a temporary disarrangement of shipping, which is the only hindrance we feel. The railroads are rapidly resuming their service and any orders placed with us now can be filled immediately from our large stock of material on hand. Yours truly, Dean Bros. Steam Pump Wks.

ORDER FOR SHAFTING

The Dodge Manufacturing Company, Boston, has secured an order from the Middlebrook Wool Combing Company, East Boston, Mass., for four lineshafts, 2 15/16 to 4 15/16, flange couplings, safety collars and seventy-two adjustable hangers with ring oiling self-lubricating bearings, split iron pulleys 36 by 14 to 71 by 24.

ANNUAL MEETING OF BELTING SALESMEN

In accordance with its policy adopted a number of years ago the Graton & Knight Manufacturing Co., of Worcester, Mass., well known oak leather tanner and belt maker, recently held a salesmen's convention at its main factory in Worcester, which was attended by the company's salesmen from all parts of the country. The various sessions were devoted to an inspection of the factory, to a study of methods of manufacture, as well as to the sale and application of the company's products. At the conclusion of the convention a banquet was served at which more than 100 officers, salesmen and other employes were present. A feature of this year's meeting which was especially inspiring to those in attendance was the presence of Henry C. Graton, founder of the company. To a very large extent the phenomenal growth of the business from a small belt shop in 1851 to a plant that is one of the largest of its kind in the world is to be attributed to the sagacity and wisdom of Mr. Graton and his early associates, and to the persistent adherence of the firm to the policy early adopted of endeavoring to meet the steadily increasing demands for the most serviceable leather belting.

A. W. BUHLMANN REPRESENTING WALLIS & LONGDEN

Wallis & Longden of Long Eaton, builders of levers and go-through lace machines, have appointed A. W. Buhlmann as their American representative. The Wallis & Longden lace machines are widely used in this country by the foremost firms in the business.

Mr. Buhlmann has made a thorough investigation of the lace trade in this country as well as in England and on the Continent and has carefully studied the merits of the different systems of lace machines and decided in favor of the Wallis & Longden system.

Any manufacturer interested in lace machinery will do well to communicate with Mr. Buhlmann before purchasing equipment.

If the right kind of size is not used, sizing warps by the chain system proves very costly, especially so when, as is often the case, the threads stick together and the sizeoleum and the soluble softening oils manufactured by The Arabol Mfg. Co., 100 William St., New York, are highly recommended. They may be used either with corn and potato starch. The Sizeoleum, making tallow superfluous, is also recommended as a reliable and superior compound on print cloth warps, sheetings and domestics.

BY THE USE OF BARRETT SPECIFICATION ROOFS

One of the wonders of modern commerce is the famous Bush Terminal in Brooklyn. It is a vast seaport in itself, stretching for over a mile along the shore of New York Bay with docking facilities for a whole navy. It is all modern, the oldest building being dated 1897. The property includes 181 different buildings, comprising tremendous warehouses, enormous pier sheds for docking ocean steamers, huge factory buildings, a large modern power house and a great freight structure.

The Barrett specification was devised by the Barrett Manufacturing Company, large manufacturers of the felt and pitch used for roofing purposes. It was their desire to establish a uniform practice of buildings roofs of this character and prevent the good will of such roofs from suffering at the hands of inexpert or careless contractors. The various methods of building tar and gravel roofs were studied by experts and the specification which was adopted was the one which should give the best results per dollar. Architects and engineers everywhere were glad enough to accept

THE BUSH TERMINAL IN BROOKLYN, N. Y.

The total roof area of these buildings is 3,100,000 square feet, or more than 70 acres. On the entire roof area the expense for maintenance thus far has been less than $10.00. If these roofs had been made of tin or ready roofing, the painting bill up to date would have probably been at least $50,000. These roofs, however, require no painting for they consist of pitch and felt laid along the lines of the Barrett specification by C. S. Buell Company.

The roofs are subjected to varied tests. Those used on the pier sheds are close to the funnels of the steamers but the sparks and hot cinders do no damage to these roofs. The acid fumes from the coal smoke are also perfectly harmless to the roofs and the condensing steam which would do damage to the underside of a tin roof has no effect on pitch and felt.

In 1912 the vice-president of the Bush Terminal Company wrote:

"We use this kind of roofing because our experience has shown it to be the best and cheapest. Our analysis of first cost of application and cost of maintenance entitles us to speak with some measure of authority."

the impartial opinion of competent experts and the Barrett specification appears verbatim in the building specifications issued by many of the most prominent engineers and architects of America.

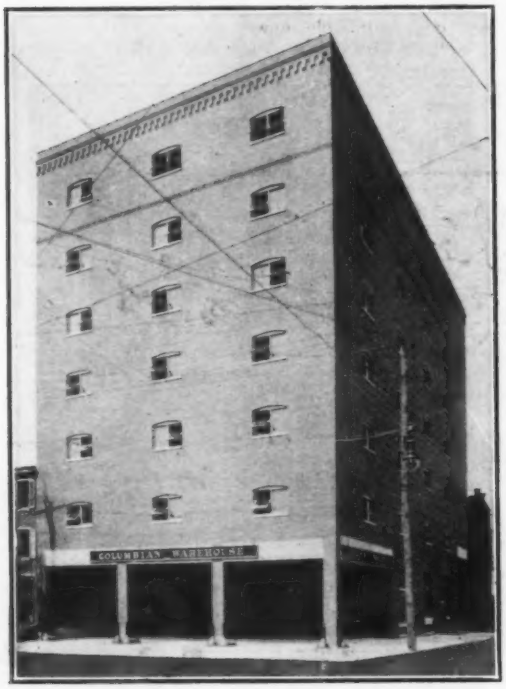
It has had an additional influence in inducing contractors to abandon their own rule-of-thumb methods and to adopt a standard practice with the results that many owners and builders who do not specify a Barrett specification roof, find they are getting it anyway. Its use is a protection to contractors, for if there is any dispute as to the quality of the work, the fact that they used a standard specification, constitutes an excellent defense.

Much good has followed also by reason of the diminution of the number of three-ply and four-ply roofs of pitch and felt which were sometimes unwisely used for the sake of cheapness. Most of the large textile mills of the country, as well as large manufacturing plants of other kinds, where the roof areas are large and flat, are covered with tar and gravel roofs of some kind, and where the roofs have been laid in substantial accord with this modern specification, the results have been

extremely satisfactory by reason of the moderate cost and the entire absence of maintenance expense.

A NEW STORAGE WAREHOUSE

The accompanying illustration shows the new storage warehouse built by the Columbian Warehouse Co., at the corner of Fifth and Laurel Sts.,



THE COLUMBIAN STORAGE WAREHOUSE

Reading, Pa. It is a seven-story structure, 110 by 60 feet. This warehouse supplies a need on the part of manufacturers, merchants and jobbers in that section and the management intends to take every precaution to meet the requirements of this class of trade.

COOPERATIVE INSURANCE

One help in the solving of our industrial problems is the creation of more friendly relations between employer and employe. The Foreman's Association at the Stetson Shoe Company, South Weymouth, has recently arranged to provide a $500 20-year endowment insurance policy for each of its twenty-five members through the insurance departments of the savings banks. The Stetson Shoe Company has offered to pay one-half the cost of the premiums on these policies so long as the policyholder remains in the employ of the company. Each year of service adds to the cash surrender value of the policy and at the end of 20 years, $500 will be paid each member of the Foreman's Association.

This act not only protects the policyholder and his family but also creates a new incentive for continuing service which helps to hold valuable employes loyal to the company. In time, perhaps, this offer of cooperative life insurance will be extended to other employes.

Doubtless this plan will be adopted by others, who, in the interest of loyal service, wish to develop a business-like cooperation between employer and employe. Massachusetts savings bank life insurance, which through the cooperation of the State and the savings banks furnishes the best insurance at lowest cost, provides an opportunity for business men to develop this cooperative insurance with their employes.

NOISELESS GEAR DRIVING

The New Process Gear Corporation, Syracuse, N. Y. A 56-page booklet containing sound engineering arguments for rawhide gears, proves that they are of important economic value in any plant where high speed gears are used, gives much transmission data, and is profusely illustrated with photographs of actual installations.

In the back of the book a few pages are devoted to the large metal gear cutting departments of the above company. A free copy will be mailed on request.

AUCTION SALES OF WOOL WASTE IN EUROPE

From Consul General Robert P. Skinner, Hamburg, Ger.

Hamburg is not an important wool market, although the foreign importations tend to increase, and no auction sales either of wool or wool waste are held here at present. Auction sales of waste are held four or five times annually at Gera (Reuss), Crimmitschau (Saxony), Cottbus, Mulhausen (Alsace), and Aix la Chapelle. The quantity of waste which may be placed on sale in one lot at these auctions is very seldom less than 50 kilos (110 pounds) and the sales are based on catalogue descriptions as well as examination of the goods. The annual turnover of wool waste at Gera, in Reuss, reaches about 500,000 marks (mark = 23.8 cents) and probably the average in all the auction markets is much the same. I supply below translations of the regulations governing these sales in Gera and Zittau:

RULES APPLICABLE TO GERA, REUSS

(1) Goods must be packed in bags which are securely sewed. The delivery note must state the contents exactly. All bales must be marked with distinctness and be provided with labels on which the number of the bales must be stated.

(2) Lots weighing under 50 kilos (110 pounds) are refused for sale at auction.

(3) If it is desired to charge for packing, the value thereof must be stated in the delivery note, otherwise it will not be collected. The packing of goods received from spinning mills will not be repaid or its value mentioned in the catalogue. Each bale must contain one article only, unless it is expressly stated to the contrary.

(4) Goods must be marked so distinctly that nobody may be in doubt respecting their character and especially the content of cotton.

(5) All bales must have a weight of at least one-half kilo (1 1/10 pounds), fractions being rounded off upward. The weights must be stated at one-half kilo under actual weight; the tare weight must be stated on the delivery note as one-half kilo, fractions being rounded off upward. The last date for the delivery of goods from any storehouse is at least 14 days before the auction.

(6) No charge will be made for storing goods, which will be insured against fire and will remain the property of the owner until the sale contract is closed. Moreover, all quantities of such goods of which sample bales only are on hand and which are not sold at auction will remain at our disposal until ten days after the auction, during which time we have a free hand to sell the goods at the limit at any time.

Commissions

For sales of goods originating from weaving factories, 1 pfennig per kilo ($0.00238 per 2.2 pounds) for prices obtained up to 0.20 mark per kilo; 5 per cent. for prices obtained more than 0.20 mark per kilo; 4 per cent. for over 1 mark per kilo; 3 per cent. for over 2 marks per kilo; 2 per cent. for over 3 marks per kilo.

For sales of goods originating from yarn-spinning mills, 2 per cent. for prices obtained up to 3 marks per kilo; 1 1/2 per cent. for prices obtained more than 3 marks per kilo, on offers at least 3,000 kilos together, otherwise 1/2 per cent. more. The lowest commission is 3 marks for each lot.

For goods stored which were not sold the following commission is charged upon the limited prices: Prices up to 50 pfennigs per kilo, commission 1 pfennig per kilo; prices above 50 pfennigs up to 1 mark, 2 per cent.; prices with the limit not less than 1 mark, 1 per cent.

If the goods are not sold when sample bales are submitted, a commission of one-fourth of 1 per cent. is charged for the limit price of the advised quantity, but at least 3 marks will be charged for each lot. No sales will be made according to samples.

No claims can be made by purchasers unless some very great mistake is attributable to the seller. Settlements are made with us within 14 days from the auction. Goods not sold are stored and insured free of charge until 4 weeks after the auction. After that delay a charge is made of 20 pfennigs for 100 kilos for each month or fraction thereof for storage room. All goods must be delivered to the railway station in Saxony.

Should a buyer refuse to accept delivery after all the lawful requirements have been complied with, the goods will be returned to the seller without responsibility on our part for damage, but the commissions would be refunded.

RULES APPLICABLE IN ZITTAU, SAXONY

(1) All local and foreign firms are allowed to participate in auctions in this branch of trade, and in the department of our public auctions for all textile products, according to samples and sample bales. Each lot must consist of at least 1,000 kilos (1 ton).

(2) One sample bale must be delivered, all charges prepaid.

(3) Three weeks before the beginning of the auction notice must be given of all consignments, and deliveries must be made according to notice.

(4) Offers may be withdrawn eight days before auctions; otherwise they are binding until three days after the auction.

(5) In all offers it must be stated where the goods are stored and the price must be stipulated free at the station.

(6) Goods are stored at the risk of the seller until delivery. The sample bale is insured against fire.

(7) The auctioneers must be informed before the auction of the weight of the goods. The weights are examined by an examiner named by the auctioneer, and buyer as well as seller must accept his decisions.

(8) Immediately after the price has been announced the invoice must be sent.

(9 Liquidation is accomplished by the auctioneer and takes place after the purchaser has acacknowledged receipt of the goods.

(10) The auctioneer's commission on the sales are: Three per cent. when the goods are worth up to 0.35 mark per kilo; 2 1/2 per cent. if the goods have a value between 0.36 and 0.70 mark; 2 per cent. if the goods have a value of 0.71 mark and above.

(11) When an offer is withdrawn the auctioneers charge one-half of 1 per cent. commission. In the event the original goods are stored instead of delivered, the auctioneers increase their fee by 2 per cent. for guarantee of freight transportation, cartage from depot to warehouse, insurance, and storage charges.

(12) The contract is to be fulfilled, as respecting both parties, at Zittau.

SHORT POSTAGE ON BUENOS AIRES MAIL

Vice Consul General Albert G. Ebert, Buenos Aires, Argentina

The following letter from a firm in this city to the American consulate general here in regard to short paid postage from the United States is self-explanatory:

"The present letter has for its purpose to advise you that all letters received from the United States have but the 2-cent stamp, and consequently we must bear the corresponding fine. We suppose that this is due to a bad interepretation of the postal rates very general among the commercial circles of that country. In view of the enormous increase in the commercial exchange with the country you represent, we recommend that you take the necessary measures to correct this deficiency, which by no means can serve as a stimulant to the development of commercial relations with this Republic."

*Pennsylvania, Perkasie. Machinery equipment is being ordered for the new silk throwing mill being built here by J. H. Frederick of Emaus.

Recent Textile Patents

CLOTH CUTTER. 1,057,914. George L. Ballard, Norristown, Pa.

CLOTH CUTTER. 1,059,190. Henry A. Meyer, Cincinnati, O.

CLOTH ORNAMENTING Machine. 1,059,200. George W. Parkinson and Ralph S. Tompkins, Fishkill-on-the-Hudson, N. Y.

COMBING MACHINE. 1,056,137. Jean C. Wenning, Muelhausen, Germany.

DOUBLING and Twisting Machine, Thread. 1,056,193. George F. Macfarlane, Wilkesbarre, Pa.

DYE VAT. 1,059,607. Alexander Hamburger, Elberfeld, Germany.

DYEING APPARATUS. 1,057,635. John H. Giles, Amsterdam, N. Y.

DYEING MACHINE. 1,057,634. John H. Giles, Amsterdam, N. Y.

DYEING MACHINE. 1,059,845. Clarence P. Delahunty, West Pittston, Pa.

DYEING MACHINES, Revolving Collapsible Dyeing Beam for. 1,059,900. Frank M. Morton, Phoenix, Ala.

HACKLING and Finishing Machine for Long-staple Fiber. 1,059,105. John E. Barbour, Paterson, N. J.

KNITTING MACHINES, Dial Positioning Mechanism for Rib. 1,056,133. Harry Swinglehurst, Boston, Mass.

KNITTING MACHINE. 1,057,782. Harry Swinglehurst, Boston, Mass.

KNITTING MACHINE. 1,056,691. David B. Kimes, Spring City, Pa.

KNITTING MACHINES, Jacquard Link for. 1,059,918. George C. Tisch, Elizabeth, N. J.

KNITTED WEBS, Making Widened. 1,056,593. Robert W. Scott, Leeds Point, N. J.

KNITTING MACHINES, Automatic Hose and Fabric Cutting Attachment for. 1,056,589. Thomas Ryan, Philadelphia, Pa.

LOOM, Automatic Filling Replenishing. 1,057,411. Randolph Crompton, Malboro, N. H.

LOOM for Weaving Wire Cloth. 1,056,174. Carlton L. Hoff, York, Pa.

LOOM SAFETY Device. 1,056,362. Edward Poenert, Rockville, Conn.

LOOM SHUTTLE Release. 1,059,904. John F. Pillsbury, Norristown, Pa.

LOOMS, Brake Mechanism for. 1,059,601. Alexis Forand, Jr., Fall River, Mass.

LOOMS, Filling Feeder for Filling Replenishing. 1,069,638. Alonzo E. Rhoades, Hopedale, Mass.

SHUTTLE. 1,056,501. Philip Comeau, New Bedford, Mass.

SHUTTLE. 1,056,629. Nelton T. Constant, Danielson, Conn.

SPINDLE for Spinning, Twisting and Like Machines. 1,058,780. Albert H. Morton, Lowell, Mass.

SPINNING FRAMES, Rail Lifting Rod for. 1,056,301. Ashford L. Quinn, Mayo, S. C.

SPOOL or Bobbin. 1,056,019. Alois Glaser, East Dedham, Mass.

UNDERGARMENT, Women's. 1,058,954. Edward Emmers, Royersford, Pa.

WOVEN FABRIC. 1,057,477. Thomas Brindle, Providence, R. I.

WOVEN FABRIC. 1,059,521. John T. Bolton, New Haven, Conn.

RECENT TEXTILE TRADE MARKS REGISTERED

58,595. Cotton piece goods. Mark: G B. Owner: Amoskeag Mfg. Co., Manchester, N. H.

63,123. Silk ribbons. Mark: Helvetia. Owner: Helvetia Silk Mill, Paterson, N. J.

69,079. Hosiery. Mark: Good Luck. Owner: Burnham-Munger-Root Dry Goods Co., Kansas City, Mo.

61,610. Textile rugs. Mark: Arden. Owner: McCleary, Wallin & Crouse, Amsterdam, N. Y.

68,676. Textile rugs. Mark: Turkana. Owner: Beattie Mfg. Co., Little Falls, N. Y.

64,037. Zephyr gingham. Mark: Pride of America. Owner: G. A. Stafford & Co., New York.

64,201. Hosiery. Mark: Gold Stripe. Owner: Gotham Silk Mfg. Co., New York.

68,091. Textile garments. Mark: Hunky-Dory. Owner: A. G. Hyde & Son, New York.

68,847. Cotton flannel and outing piece goods. Mark: Elsee. Owner: Hunter Mfg. & Commission Co., New York.

68,959. Cotton goods. Mark: Linweb. Owner: Cohn Hall Marx Co., New York.

68,963. Cotton goods. Mark: Nestledown. Owner: Hunter Mfg. & Commission Co., New York.

69,028. Cotton cloth. Mark: Hercules. Owner: S. H. Greene & Sons Corp., Clyde, R. I.

65,037. Bleaching material. Mark: Bondsour. Owner: The Roessler & Hasslacher Chemical Co., New York.

66,865. Knit mesh cloth. Mark: Luco. Owner: The Linen Underwear Co., Greenwich, N. Y.

66,889. Textile rugs. Mark: Kiltie. Owner: William Henderson & Co., Bristol, Pa.

63,388. Hosiery. Mark: Euclid. Owner: The H. T. Spencer Co., Cleveland, O.

64,588. Cotton yarns. Mark: Dexter Bellfast Twist. Owner: The Dexter Yarn Co., Pawtucket, R. I.